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ABSTRACT

This guide presents strategies for developing or upgrading secondary school agricultural education programs with the Illinois Agricultural Education Core Curriculum. Following an introduction, the guide provides the following: (1) the goals of the Education for Employment K-adult curriculum model; (2) a rationale for this curriculum change; (3) an explanation of the five phases of agricultural education; (4) a description of the nature and scope of agricultural education in grades 9-12 and how to implement it; (5) an explanation of how teachers can use the core curriculum's 141 problem areas as resource units; (6) information on labs, facilities, and equipment suggested for biology and chemistry, food science, physical science, agribusiness, storage, and greenhouse/plant science labs; (7) a short summary; (8) a list of 10 references; and (9) five appendices. The appendices consist of the following: core problem areas classified according to primary emphasis and level of instruction; a matrix of problem areas with occupational tasks; directions on developing agricultural course outlines from core units and problem areas; and core curriculum course planning forms. (CML)

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The Illinois Plan for Agricultural Education

An Implementation Guide for Secondary Programs

Illinois State Board of Education

Louis Mervis
Chairman

Robert Leininger
State Superintendent of Education

Department of Adult, Vocational and Technical Education

June 1991

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The Illinois Plan for Agricultural Education

An Implementation Guide for Secondary Programs

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The Illinois Plan for Agricultural Education
An Implementation Guide

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Foreword

In recent years, the Illinois State Board of Education has sponsored many activities for the purpose of improving agricultural education in Illinois. This Implementation Guide is a result of one of these activities.

Recognizing that one out of every five employees in Illinois is employed in the food and fiber system, it is important for our young people to become agriculturally literate in order to be prepared to take advantage of the widest array of employment opportunities. In addition, it is important for all citizens to have a basic understanding of how the necessities of life are produced, processed, marketed, and consumed.

Agricultural education can be accomplished in a variety of ways at various levels in the educational system. Education for Employment initiatives including Tech Prep programs, agricultural literacy, and agricultural science courses created with the new Agricultural Core Curriculum as their foundation are a few of the many ideas presented in this document.

Administrators, curriculum directors, and teachers throughout the state are encouraged to use this document as they assess their current programs and make revisions that will better prepare individuals to live in the twenty-first century.

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Introduction

The Illinois Plan for Agricultural Education is a document published in two parts:

The Illinois Plan for Agricultural Education: A Planning Guide

The Illinois Plan for Agricultural Education: An Implementation Guide

The Planning Guide discusses major reform efforts and initiatives affecting education and agricultural education specifically. In addition, it identifies several phases of agricultural education and objectives for each phase. Some of the information found in the Planning Guide is summarized below.

The Implementation Guide presents strategies for developing and/or upgrading secondary (high school) agricultural education programs primarily based on using the new Illinois Agricultural Core Curriculum. Several options are discussed including vocational agricultural education, Tech Prep programs in agriculture, agricultural literacy, and agricultural science.

The Illinois Plan for Agricultural Education was developed in response to several initiatives in education which suggested the need for reforming agricultural education in the public schools.

Five major initiatives providing impetus to the development of the Illinois Plan for Agricultural Education are described in the following paragraphs.

In 1982, the Illinois State Board of Education (ISBE) directed the State Superintendent of Education to conduct a comprehensive policy study on the issue of "Education for Employment". This study revealed several challenges which confronted the vocational education enterprise including (1) rapid technological change; (2) changes in the characteristics of the work force; and (3) the need for education to support the economic stability of individual citizens and the state economy.

In 1985, Public Law 84-126 was enacted and *The School Code of Illinois* was amended to include a definition of schooling and a requirement that goals for learning be identified and assessed. Local school districts are now required to develop and submit for approval by the ISBE, local learning objectives which meet or exceed the State Goals for Learning in six fundamental areas. These areas are language arts, mathematics, biological and physical sciences, social sciences, fine arts, and physical development and health. Agriculture teachers are obliged to include appropriate learning objectives in these six areas in their instructional programs.

Another important initiative which contributed to the Illinois Plan for Agricultural Education was a document developed by the Illinois Leadership Council for Agricultural Education (ILCAE) in 1987 entitled *Building Illinois Through Quality Agricultural Education* that was later recognized as part of Senate Bill 2255. This legislative measure states that "a state program for agricultural education shall be part of the curriculum of the public school system *K through Adult*, and made readily available to all school districts which may at their option, include programs in education in agriculture as a part of the curriculum of that district." State funding has been provided to promote the development of broad agricultural education programs in Illinois schools.

At the national level, a committee on Agricultural Education in Secondary Schools was established by the National Research Council in 1985. This committee was asked "to assess the contributions of instruction in agriculture to the maintenance and improvement of U.S. agricultural productivity and economic competitiveness here and abroad." The committee was asked to offer recommendations regarding:

1. Goals for instruction in agriculture;
2. Subject matter and skills that should be stressed for different groups of students; and
3. Policy changes needed at the local, state, and national levels to facilitate the new and revised agricultural education programs in secondary schools.

The Committee's report was published in 1988 and is entitled, *Understanding Agriculture—New Directions for Education.*

These initiatives along with recommendations from other agriculture and education groups provided the context and major substance for the Illinois Plan for Agricultural Education. This plan was developed by project staff, a state design team and other educators involved in the Illinois Core Curriculum Revision Project conducted at the University of Illinois and financially supported by the ISBE, Department of Adult, Vocational and Technical Education (DAVTE).

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Education for Employment Curriculum Model

A fifth major initiative affecting agricultural education in Illinois is the Tech Prep program movement. Tech Prep stands for technical preparation and represents an educational path that integrates academic coursework with a rigorous technical education concentration. It is a planned sequence of courses, both academic and technical, that begins at the ninth grade and is articulated with a post-secondary experience leading to an associate degree. Because Tech Prep prepares students for a lifetime of learning, it also provides preparation for advanced education such as a four-year baccalaureate degree. Properly planned and implemented Tech Prep programs prepare students with the skills and competitiveness necessary to meet employers' performance standards not only for entry level jobs, but also for career advancement.

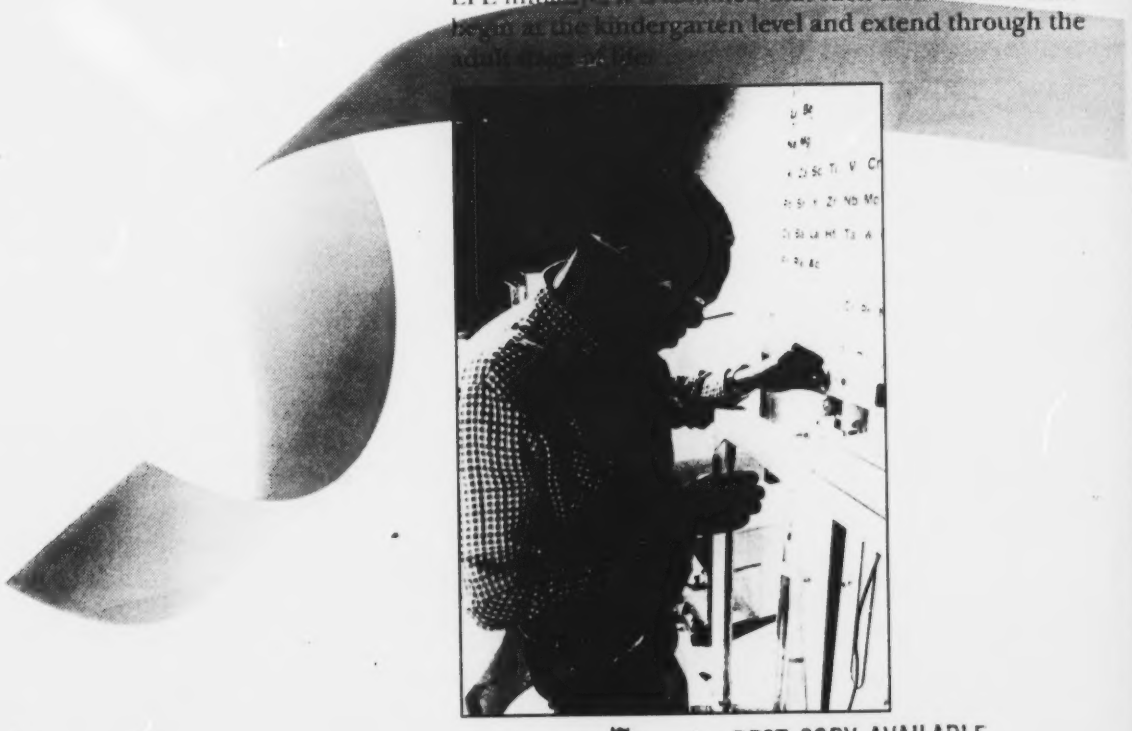
The new Illinois Agricultural Core Curriculum was developed to be both academically rigorous and technically sound in its presentation of agricultural knowledge and skills. This curriculum can provide the foundation for Tech Prep programs in agriculture.

To assist schools in revitalizing vocational-technical education as addressed in the Education for Employment concept, a curriculum model was prepared to show the five phases of career development which can be incorporated into a K–Adult delivery system.

All the EFE initiatives emphasize the need for a lifelong commitment to learning. They recognize the need for both academic education and vocational-technical education in the preparation of individuals for employment and career development. The basic goals of EFE are:

1. To enhance and expand learner's basic academic skills so they are equipped to cope with, live in, and contribute to a society undergoing constant change, and
2. To prepare all students to attain a satisfactory level of achievement appropriate to either immediate employment or advanced education in preparation for later employment.[1]

While no specific grade levels have been designated as recommended times for scheduling the five phases of the EFE initiative, it is assumed that such instruction could begin at the kindergarten level and extend through the adult years.[2]



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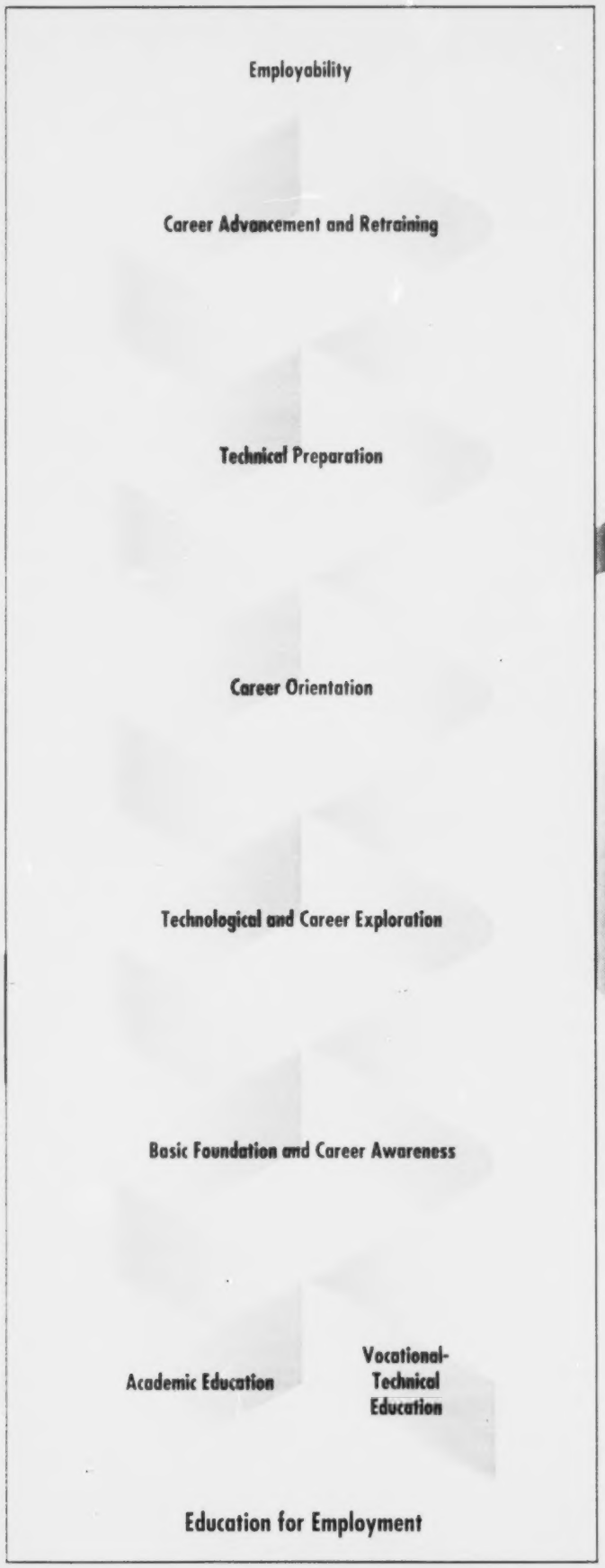

Rationale

Technological and economic forces have led to a steady decline in the number of farms and an increase in farm size. In Illinois, the number of farms declined from 98,483 in 1982 to 88,786 in 1987.[7] However, during this same period, the total cropland acres actually increased from 24,748,112 in 1982 to 25,102,092 acres in 1987.

In 1985, only 2.2% of Americans lived on farms but nearly 20% of the labor force worked for the agricultural industry.[8] In Illinois, an extensive labor market study conducted in 1988 determined that one out of every five employees is working in the food and fiber system. This was slightly over one million individuals.[9] Approximately 90% of these individuals were employed in non-production agricultural business and industry positions.

These changes in the agricultural sector were not restricted to the last decade. The decline in the number of farms and farmers has been going on for most of this century; however, the changes which have occurred after World War II have been most striking.

Among the structural and policy changes in agriculture identified in a study on agricultural education in the secondary schools were the following:

1. Federal agricultural policies influencing farm production;
2. Integration of the agricultural sector into the international economy;
3. Scientific progress in developing new production techniques; and
4. Technological advances in all facets of agriculture.[10]

The need for reform in agricultural education is based on the economic and social realities which change has brought. Agricultural education programs must reflect contemporary labor market needs and human resource requirements. Today's agricultural workplace demands a labor force that possesses not only advanced technical skills, but strong academic and interpersonal skills and a willingness to continue to learn. The new Agricultural Core Curriculum recognizes that agriculture teachers and academic teachers must work cooperatively to produce the type of employee in demand.

A design team consisting of representatives from the Illinois Joint Staff in Agricultural Education identified

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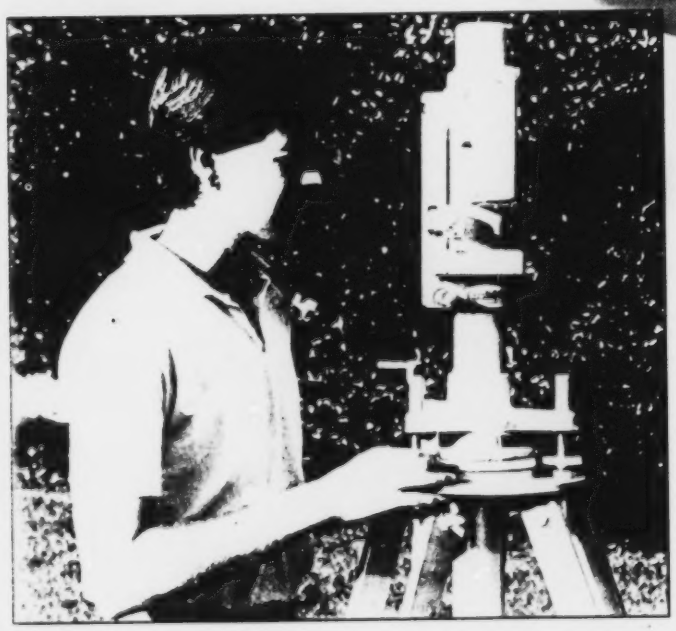
Illinois Plan for Agricultural Education: A Planning Guide

eight assumptions which were recognized in the revision of the Illinois Core Curriculum in Agriculture. These assumptions were as follows:

1. Major changes have occurred in agricultural technology.
2. A broadened curriculum is needed.
3. Greater emphasis should be placed on applied science.
4. Employability skills should be taught.
5. Occupational opportunities must be considered.
6. Agricultural education should contribute to the primary purpose of schooling.
7. Advisory personnel should be utilized.
8. Local program needs should be addressed.

One of the goals of the Illinois Plan for Agricultural Education is to propose an educational model which addresses these assumptions and concerns. This program implementation guide deals primarily with one phase of the Illinois Plan—the secondary school phase.



The Illinois Plan for Agricultural Education: A Planning Guide divides the lifelong process or program of agricultural education into five phases. These phases are:

1. Elementary School Agricultural Education
2. Middle School - Junior High School Agricultural Education
3. Secondary School Agricultural Education
4. Postsecondary Agricultural Education
5. Continuing Agricultural Education

The five phases of agricultural education can be scheduled into the curriculum beginning at the kindergarten level and extending through the adult education level. However, the assignment of these phases to particular grade levels does not mean that alternative schedules cannot be successfully implemented.

Instructional programs serve different purposes depending on the phase being offered and the clientele being served. The primary objectives which should be emphasized or achieved for each phase and/or delivery system are shown in Table 1.

Phase I: Elementary Agricultural Education

Agricultural Education instruction at the K-5 level can be integrated into existing subject areas commonly taught in elementary schools. Separate courses in agriculture are not recommended at this level. However, teachers can utilize *Agriculture in the Classroom* materials and other resources to promote agricultural literacy, and build an awareness of agricultural career opportunities. Teachers can also use agricultural projects and activities to contribute to the achievement of the primary purpose of schooling as defined by the Illinois State Board of Education.

New K-6 agriscience kits have been designed and assembled by research staff at the University of Illinois under the direction of Drs. Dale Law and Jerry Pepple. These kits integrate basic science and agricultural concepts into hands-on activities and cover such topics as: Agriculture Renews Our Planet; Growing Energy for the

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Future: Eggciting Experiments: Chick Incubation and Embryology; Agriculture Measures Up: Using Mathematics in Agriculture; Animals in Agriculture: Their Growth and Development; Dairy Delights: Good Nutrition from Milk; Growing Better Everyday: Using Genetics to Improve Agriculture; Insects: Agriculture's Foes or Friends; Probing Our Soils: Getting to the Roots of Agriculture; Protein Providers: The Superb Soybean; and, Rain or Shine: Weather's Effect on Agriculture.

A fourth-grade agricultural curriculum activity guide has also been developed which matches student activities in agriculture with each of the six state goals for learning. In addition, an extensive reference list of free or inexpensive resources which relates agricultural concepts to elementary students has been published.

Phase II: Middle School/ Junior High School Agricultural Education

Phase II of the Illinois Plan for Agricultural Education can be scheduled during grades 6-8. Agriculture courses are not commonly offered at these grade levels in most Illinois school districts; however, in recent years, semester or one-year courses have begun to appear in grade 7 and 8 offerings. When such courses are developed and taught, the emphasis should be placed on extending the students' general knowledge of agriculture (literacy), using agriculture as a vehicle to achieve the primary purpose of schooling, promoting technological literacy, and exploring career options. Agricultural curriculum and activity guides have been developed specifically for use in grades 7 and 8 by a team of researchers at Southern Illinois University directed by Drs. Tom Stitt and James Legacy. The activity guides address topics in biological and physical science as they relate to agriculture (food and fiber system). The units developed to date cover the topics of: plant identification, asexual reproduction, sexual reproduction, photosynthesis, plant conductive tissues, and soil pH.

Table 1

Primary Objectives or Areas of Emphasis for Different Phases (Levels) of Agricultural Education

Objective or Program Emphasis	Phase of Agricultural Education				
	K-6	Jr.High/ Middle	Secondary	Post Secondary	Continuing
Agricultural Literacy	■	■	■		
Agricultural Career Awareness	■				
Contribution to the Primary Purpose of Schooling	■	■	■		
Technological Literacy		■			
Agricultural Career Exploration		■			
Orientation to Agricultural Education			■		
Preparation for Employment			■		
Preparation for Further Education			■		
Technical Training				■	
Preparation for University Education				■	
Professional Preparation					■
Continuing Education					■
Training and Retraining					■
Avocational Agriculture					■

Phase III: Secondary School Agricultural Education

Traditionally, serious attention to the teaching of agriculture in Illinois schools has begun in grade 9. Many high schools offer a four-year sequence of courses historically referred to as vocational agriculture. The Illinois Plan for Agricultural Education seeks to broaden traditional vocational agriculture to include: agricultural literacy and career orientation, reinforcement of instruction embodied in the Primary Purpose of Schooling, emphasis on

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agricultural business and industry needs, and an increased preparation for further education in agriculture beyond the high school level through the promotion of Tech Prep programs.

In addition to the suggested content for new courses based on the Agricultural Core Curriculum (Appendix D), two Teacher's Guides have been developed by a team of researchers at the University of Illinois directed by Dr. Edward Osborne for use at the secondary level. One Teacher's guide incorporates biological science applications in agriculture and the other Teacher's Guide incorporates physical science applications in agriculture.

This Implementation Guide focuses primarily on modifying high school programs of agricultural education; therefore, another section of the Guide will address the challenges of curriculum planning at this level. For additional information about implementing K-6 and Middle School/Junior High School agricultural education programs, please refer to the appropriate Implementation Guide available from ISBE/DAVTE.

Phase IV: Postsecondary Agricultural Education

Community college agriculture programs provide technical training in agriculture and transfer programs for students who plan to pursue a baccalaureate degree in agriculture. These programs build on the foundation which has been established during Phases I—III. In order to provide students with opportunities that maximize experiences at both the secondary and post-secondary levels, it is essential to articulate curricula at each level. Tech Prep represents a strong linkage between each level to provide a smooth transition with minimum duplication of effort.

Phase V: Continuing Agricultural Education

As shown in Table 1, this phase of the Illinois Plan includes the study of agriculture at a university by students who are preparing for a career in the agricultural profession. As such, these programs are not supported with federal or state vocational funds, but they do provide an important part of the K-Adult education continuum.

In addition, Phase V includes adult education job-training and retraining, and avocational agricultural education offered by colleges, universities, high schools, and other delivery systems. In some schools local chapters of the Illinois Leaders in Agriculture provide structure and guidance to adult education in agriculture programs.

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Nature and Scope of Agricultural Education at the Scondary School Level (Grades 9-12)

The Illinois Plan for Agricultural Education developed by the Core Curriculum Design Team is designed to broaden the scope of agricultural education at the high school level. While the traditional role of vocational agriculture is still important, other types of programs designed to serve a broader array of students are needed. Also, in the Illinois Plan, agricultural education has been modified to emphasize preparation for employment in agribusiness and off-farm areas with less emphasis on production agriculture (farming).

The Department of Adult, Vocational and Technical Education, Illinois State Board of Education has identified four program clusters in agricultural education. These cluster areas are as follows:

1. Agricultural Business and Management
2. Horticulture
3. Agricultural Resources
4. Agricultural Power and Machinery

The Illinois Agricultural Core Curriculum includes units and problem areas for the first three clusters along with a central core of instructional materials which cuts across cluster lines (see DAVTE Handbook for Secondary Vocational Education Program Planning).

The high school program of agricultural education is designed to serve students in grades 9-12; however, the Illinois Plan recognizes that not all students will enroll in or complete a four-year sequence of courses. The intent of the Illinois Plan is to increase options for students, serve a variety of interests and needs, and reach a large number of students who want and need some type of agricultural education experience.

In planning a local/regional program with a four-year sequence, teachers are encouraged to schedule orientation instruction for grades 9 and 10 and preparatory instruction for grades 11 and 12. Teachers are encouraged to articulate their programs and courses with the programs and courses offered by their post-secondary insititutions and to develop formal Tech Prep programs where appropriate.

The implementation of the Illinois Plan for Agricultural Education at the local/regional level should include a recognition of the following suggested educational reforms:

1. Incorporation of the two main educational thrusts as recognized by the Education for Employment (EFE) program in Illinois, namely, skill development based on identified worker tasks and preparation for further education beyond the high school level
2. Identification in each district of the Student Learning Outcomes to address the State Goals for Learning, through a cooperative effort of all teachers in the school system
3. The teaching of more performance and process skills in science, mathematics, and language arts (communication skills), as recommended by the school reform movement
4. Improving the agricultural literacy of the large proportion of the population which is not engaged directly in agriculture, according to the national effort called for by leaders in agriculture and agricultural education
5. Increased emphasis on articulation between secondary and post-secondary institutions

The application of these suggested reforms would lead local/regional program planners to consider agricultural education courses such as the following:

1. **Agricultural Occupations Courses**—These courses would be designed primarily for those students who are interested in preparing for employment immediately after high school graduation without plans for further education.
2. **Agricultural Technology Courses**—These courses prepare students for employment in agriculture, but also build a foundation for further education at a community college or university.
3. **Agricultural Science Courses**—These courses would be designed primarily for college-bound students who are planning to pursue undergraduate and perhaps graduate study in agriculture or a closely related area.
4. **Agricultural Literacy Courses**—These courses would be designed for students who are not planning careers in the agriculture field, but who are interested in the field in order to better discharge their civic

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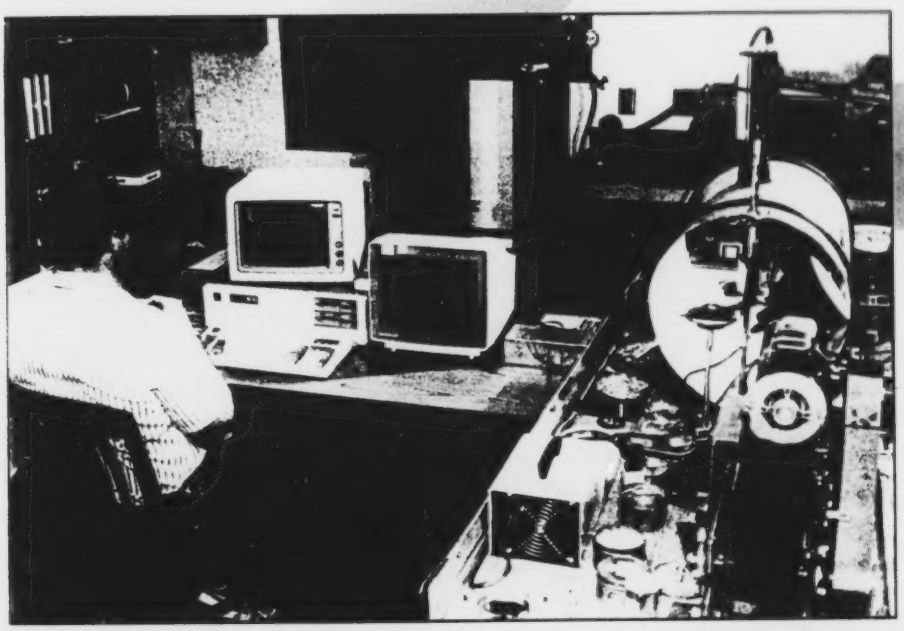
responsibilities and to understand and appreciate the
- role of agriculture in society and its impact on the environment.

The revised Illinois Core Curriculum in Agriculture is composed of 141 problem areas (instructional guides) identified as appropriate content for secondary school programs. These problem areas have been classified and assigned to one or more of the program areas and have been designated for either orientation or preparatory level instruction. See Appendix A for a matrix which shows these classifications and listings. In addition, each problem area identifies the appropriate academic competencies that have been integrated into it.



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Implementing the Illinois Plan for Agricultural Education at the Secondary School Level

Local school districts/regional systems must decide the nature and scope of the agricultural education program to be offered. Some of the options are as follows:

1. Implement vocational-technical education including Tech Prep programs as outlined by the ISBE. Programs approved under this arrangement are eligible for vocational funding from the Department of Adult, Vocational and Technical Education.
2. Implement the program and supplement it with other instruction from the Illinois Plan for Agricultural Education. This instruction may not qualify for vocational funding.
3. Develop and offer agriculture courses of a non-vocational nature such as agricultural science and agricultural literacy.

The option selected will determine the program planning process to be followed. Schools which offer vocational-technical education programs will coordinate their offerings with other districts in their EFE system. Schools planning to offer a broader array of courses or programs may also utilize some of the implementation procedures described in the following sections.

The Illinois Plan for Agricultural Education may be implemented at the local level in (1) school districts where no agriculture programs are currently conducted, and (2) school districts which now offer an agriculture program which needs to be revised, modified, or expanded.

Procedures used in both situations are basically the same. The major steps involved in the program planning process can be followed in most school districts; however, a more thorough and detailed needs assessment will have to be carried out in communities where new agriculture programs are to be developed. Other differences in the basic program planning procedure might include the identification of persons who will plan the program, variation in planning time required to develop a program, involvement of resource persons and outside consultants, and coordination of efforts of the program planning team, advisory committees, board of education, and school administrators and teachers.

A basic, step-by-step procedure for developing a new agricultural education program or modifying an existing program could include the following steps:

1. Assess educational needs of students to be served. Needs assessment studies should be conducted by the agriculture teacher and the agriculture advisory council. Needs of various client groups should be identified and expressed in terms of type of instruction needed (vocational, technical, college-preparatory or agricultural literacy), level of instruction, and extent to which student needs in agricultural education will be met by other agencies or delivery systems. The needs assessment study should also describe the type of student (academic ability, agricultural background and experiences, and occupational goals) to be served by the program.
2. Develop program mission and goals. An agricultural education mission statement should be written based on the needs assessment results in step one. Written goals should be identified to provide guidance in accomplishing the mission of the program.
3. Develop program objectives. These objectives should describe what the program of agricultural education is supposed to accomplish, the groups to be served, and the outcomes to be achieved.
4. Prepare a list of assumptions which must be considered in developing a program. These assumptions should include answers to the following questions:
   a. How much teacher time will be devoted to agricultural instruction and related activities?
   b. What facilities and equipment will be made available?
   c. Will adult education, active youth organizations, and supervised agriculture experience programs be encouraged or required?
   d. Will science credit be given for agricultural science courses?
   e. Will the agriculture teacher(s) be employed with an extended contract?
   f. Will agricultural literacy courses be offered?
   g. How will agriculture courses integrate academic concepts in support of the state goals for learning?
   h. How will the agriculture teacher and academic teachers collaborate to develop courses which

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mutually support your local Illinois Goal Assessment Program (IGAP)?

5. Identify courses to be offered and prepare a long-term (4- to 6-year) schedule showing which courses will be offered each year.
6. Prepare a course description, course objectives, and course content for each proposed course (see Appendices B, C, D, and E). Explore possibilities for offering cooperative education or supervised agricultural experience courses.
7. Consider the following suggestions for identifying course content and installing the core curriculum units and problem areas in the instructional program:
   a. Select the core problem areas which should be taught and assign them to the proposed courses. Ignore core problem areas which do not meet the educational needs or contribute to local program objectives.
   b. Add additional problem areas which address unique needs of the local community. Instructional content added at the local level may constitute as much as 40% of the curriculum.
   c. Schedule the proposed problem areas for each course to allow for seasonal arrangement of instruction, efficient use of classroom and laboratory space, and coordination of class instruction and FFA activities.
   d. Use the Core Planning Forms included in Appendix E to expedite the course planning process.
8. Articulate programs and courses with the appropriate post-secondary insitutions.

To assist teachers and other local/regional program planners in the preparation of course outlines, the 141 problem areas have been assigned to course titles which might be offered by a local district. The clusters and recommended course titles listed in the DAVTE Handbook for Secondary Vocational Education Program Planning were used as examples of instructional offerings. In addition, three agricultural science courses and four agricultural literacy courses were identified as examples. Each of the 141 problem areas in the revised Core Curriculum were assigned to one or more courses. See Appendix D for these listings. In reviewing these listings teachers should be cautioned not to consider them as recommended course outlines. The development of course outlines must be accomplished at the local/regional level; however, in the process of this development, selected core problem areas should be considered as possible content.

Using the Core Curriculum Problem Areas

The Illinois Core Curriculum in Agriculture Project was devoted to the development of 141 problem areas for use at the high school level. These problem areas comprise the "Core" or essential elements of the agriculture clusters recognized by the ISBE, Department of Adult, Vocational and Technical Education, plus a "Central Core" judged to be appropriate learning material for all students regardless of their specialized interest in agriculture.

The problem areas are resource units which can be used as an aid to teachers in preparing teaching plans. For the most part, these problem areas do not include all of the content or instructional materials that teachers will want or need to teach the suggested topic. Also, some of the material included may not be appropriate for a given class or situation and should be deleted. In preparing the problem areas, the following basic assumptions were made:

1. Teachers will develop their own teaching plans from the problem area material. Some problem areas are very broad in scope and may require several teaching plans to cover all the content.

Table 2

Section	Description or Use
Introduction	
Cluster	Refers to one of the agricultural clusters recognized by DAVTE or the Central Core Cluster.
Unit	A subdivision of a cluster.
Problem Area	A subdivision of a unit.
Related Problem Areas	Other Core problem areas which may be taught in conjunction with this problem area.
Prerequisite Problem Area	Instruction which should precede the problem area.
Level	Orientation (9-10) or Preparatory (grades 11-12).
Occupational Tasks Addressed	Duties and tasks taken from the State Task List which relate to this problem area
State Goals for Learning	A State Goal for Learning and student learning objectives which are related to the subject matter of this problem area.
Learning Assessment Plan	The form used by local districts to report their SLO's and instructional plans.
Subsequent Pages (Note: The remainder of the problem area is divided into three sections namely, the Instructor's Guide, Instructional Resources, and Student Activities)	
Section 1—Instructor's Guide	
Student Learning Objectives	A list of possible objectives which a teacher might consider in developing a teaching plan.
Problems and Questions for Study	A list of possible study questions and problems which might be used in teaching this problem area.
Suggested Teaching Activities	Suggestions for the teacher concerning class activities and procedures; suggested activities for students.
References	Reference books, articles, or other subject matter materials and audio-visual aids.
Section 2—Instructional Resources	
Instructional Resource List	A listing, by title, of items included in this section.
Information Sheets	Brief summary or outline of certain areas of subject matter included in the problem area.
Transparency Masters	Information and diagrams which might be projected on a screen or used as handouts.
Section 3—Student Activities	
Student Worksheets	Problems and class activities for students to complete.
Teacher's Key	The worksheets with answers or problem solutions.

Classrooms and Laboratories

2. The material included in the problem area will be modified and adapted to the teaching situation where it is to be used.
3. Teachers may need to prepare themselves to teach some of the problem areas by participating in in-service educational activities or self-study.
4. The scientific method as well as academic content will be taught.
5. The instructional program should include a balance of learning experiences in the psychomotor, cognitive, and affective domains.

The basic format is essentially the same for all of the problem areas. A brief description and suggested use of each section of a problem area is outlined in Table 2.

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The Illinois Plan for Agricultural Education describes agricultural education programs that are much different from those of the past. The new Illinois Agricultural Core Curriculum provides the basis for developing relevant up-to-date local/regional curricula and programs of the type envisioned by the Illinois Plan for Agricultural Education. Not only must the curricula change, but as they change, so must the agricultural education classroom and laboratory.

The plans for an agricultural education classroom and laboratory are proposed not as specific targets, but rather as focal points to guide decisions concerning updated program needs and objectives. If agricultural education is to provide relevant instruction **in** agriculture and **about** agriculture, traditional classroom and shop facilities and equipment must be changed to support the new content which includes such topics as: biotechnology; aquaculture; hydroponics; agricultural commodities; agribusiness marketing and management in a global economy; public policy; environmental resource management; nutrition and health; and applied agricultural sciences in biology, chemistry, and physics.

The proposed agriscience and technology laboratory will move agricultural education into the mainstream of the educational system and remove its past isolation, both literally and figuratively, from other academic subject areas. A much wider range of students will be encouraged to take advantage of agricultural education under the direction of a qualified teacher using modern facilities and equipment. It is intended that agricultural education should become a full partner with the academic community and other education and training providers, to improve the future of those students taking advantage of the educational and career opportunities within the food and fiber system. Many students reach the secondary level deficient in academic skills. Agricultural education programs must address this deficiency if agricultural education students are to take advantage of opportunities in the many career areas which will be found in agriculture in the year 2000. As suggested earlier, employers want graduates with a solid background in basic academic skills in applied settings. Agricultural education can reinforce academic skills through directed integration and application.

The term "integration" in agricultural education means the teaching of academic content and skills that support

Facilities and Equipment

competent performance of occupational tasks using instructional methods to assure the transfer of skills to other settings and situations. The environment of these proposed laboratory facilities should enhance joint efforts between vocational and academic educators to provide a cooperative teaching/learning situation. This cooperative endeavor will help end the schism between voctional and academic educators; it will show that each has much to offer and that educational challenges can best be met through a holistic approach. There is a growing consensus that people do not all learn the same way. Agricultural education can be a vehicle to provide academic skill acquisition, enhancement, and transference to those who have not been successfully reached through traditional methods of instruction. Academic skills learned in an applications mode and used in an agriscience and technology laboratory will be more meaningful to these students.

The new Agricultural Core Curriculum has taken a proactive stance and has embarked on an effort to meet the challenge of strengthening academic skills. Through the development of facilities such as those proposed, agricultural education can move forward to a new level of integrated programs that will contribute significantly to the goals of academic achievement and successful employment.

The Illinois Agricultural Core Curriculum and other modern applied academic curricula, when properly implemented through a planned program revitalization effort, will assure that all students have the opportunity to participate in and benefit from agricultural education. Instruction should be articulated to progress from one level to the next to promote lifelong learning. The following facilities and equipment proposal is designed to complement ISBE/DAVTE vocational-technical education initiatives including Tech Prep programs for modernizing and realigning agricultural education programs to meet the needs of students pursuing employment and/or further education. This facilities plan was a result of requests from teachers, administrators, business representatives, and school boards to conceptualize a revolutionary agricultural education program which embraces the goals and objectives of the Illinois Plan for Agricultural Education, the Agricultural Core Curriculum, and the Illinois State Goals for Learning.

The facilities section includes suggested requirements for the laboratory and classroom. The specifications for the items should be designed according to the unique requirements of the local educational situation and should meet the standards of the individual districts. The intent is to provide a laboratory facility that addresses safety concerns and assures the basic utilities required for the laboratory sections of the Agricultural Core Curriculum. The wall structure and size specifications were chosen because many existing agricultural shops were designed around the 40' × 60' plan. This will vary according to the local classroom/shop design.

The equipment section includes capital equipment items and items that are necessary for the safety of the individual student. Many of these items may already be in the local agricultural education department or may be available through the science and mathematics departments. In most instances, it will not be necessary to stock all of the items listed until the complete program plan is implemented. It is expected that the program would be phased-in over a period of years as determined by your local/regional curriculum planning committee.

The following is a basic listing of facilities and equipment that would be useful in operating the laboratories and classroom. These lists are not comprehensive and should be used only as a guide.

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1. Biology/Chemistry Laboratory

Within the Biology/Chemistry Laboratory there is space for 24 students. Each lab table has a sink, gas jets, and seating for four students. The lab tables are approximately 4' × 5'2". In the top right-hand corner is located the safety area. The items to be included in this area were listed previously. On the left-hand side of the room is included an aquaculture tank and equipment. The instructor's demonstration table, located at bottom center, also has a sink and gas jets. This location was chosen so that chairs might be set up in the space directly in front of the table.

Facilities

1. Safety shower (specifications to satisfy state requirements) and floor drain—one per lab room
2. Eyewash (specifications to satisfy state requirements)—one per lab room
3. Fire blanket—one or two as needed per lab room
4. Fire extinguisher (class ABC)—two per lab room
5. First aid kit to treat minor injuries—one per lab room
6. Kit to cleanup acid spills—one per lab room
7. Kit to cleanup caustic spills—one per lab room
8. Kit to cleanup solvent spills—one per lab room
9. Manual on proper disposal of chemicals such as *Prudent Practices for Disposal of Chemicals from Laboratories* or *CRC Handbook of Laboratory Safety*—one for school
10. Vent hood (specifications to satisfy state requirements)—one per lab room
11. Solvent storage cans—as needed
12. Chemical storage cabinets (specifications to satisfy state requirements) to separate acids, solvents, and corrosives—one of each per lab room)
13. Buckets to transport jugs of acid and other hazardous reagents—two per lab room
14. Sinks with running water and p-traps—one for every four students
15. Deionized or distilled water source
16. Sterilizer for safety goggles
18. Lab bench space approximately 2.5 ft. by 3.5 ft. one for every two students
19. Natural gas or LP gas outlet on lab bench top—one for every two students
20. 115-volt ac duplex electrical outlet on lab bench top, one for every two students
21. Counter space or wall rack to dry lab glassware—one per lab room
22. Paper towel holder at each large sink
23. Locking storage cabinets for glassware and microscopes
24. Clock with sweep second hand

Equipment

1. Triple beam balance calibrated to 0.01 g—one for every four students; or digital balance calibrated to 0.01 g—one for every ten students
2. Centrifuge—one for class
3. Safety goggles with baffled vents to provide splash protection for the eyes—one pair for each student
4. Lab apron—one for each student
5. Disposable gloves
6. Nonslip-hot-mitt for handling hot beakers and flasks—one for every two students
7. Microscopes—one for every two students

   Specifications: 10X ocular lens, 4X, 10X, and 40X objective lenses (parfocal). Stage with stage clips and iris diaphragm. Coarse adjustment knob. Fine adjustment knob (preferred). External light source such as 10 W gooseneck reading lamp. Lens cleaning kit. Operator and service manual. Warranty and service policy
8. Animal kingdom set
9. Bio-rack mobile with 2 terraria, 2 cages, 2- to 6-gal aquaria
10. Biology slide set
11. Bio hazard chart
12. Lab techniques chart
13. Lab safety chart
14. Periodic table chart
15. Bunsen Burners
16. Etherizer
17. Hot plates
18. Plant kingdom set
19. Hydroponics Apparatus
20. Aquaculture tank and equipment
21. Electrolysis apparatus
22. Spectrophotometer
23. Drying oven
24. Cells—primary and secondary
25. Desiccator
26. Molecule sets
27. Greenhouse equipment
28. Chemicals, laboratory glassware and hardware, and supplies as needed, determined by student activities

2. Food Science Laboratory

The setup of the Food Science Laboratory is very similar to an average kitchen with the inclusion of tables, chairs, and a demonstration table. Along the left-hand side of the room is cabinet space interspersed with normal food processing items. These include (from the top down along the left side of room 2 in the drawing) a dishwasher, a microwave on the counter, an oven/range, and a sink. Around the corner are a refrigerator and an upright freezer.

Facilities

1. Refrigerator
2. Freezer
3. Microwave Oven

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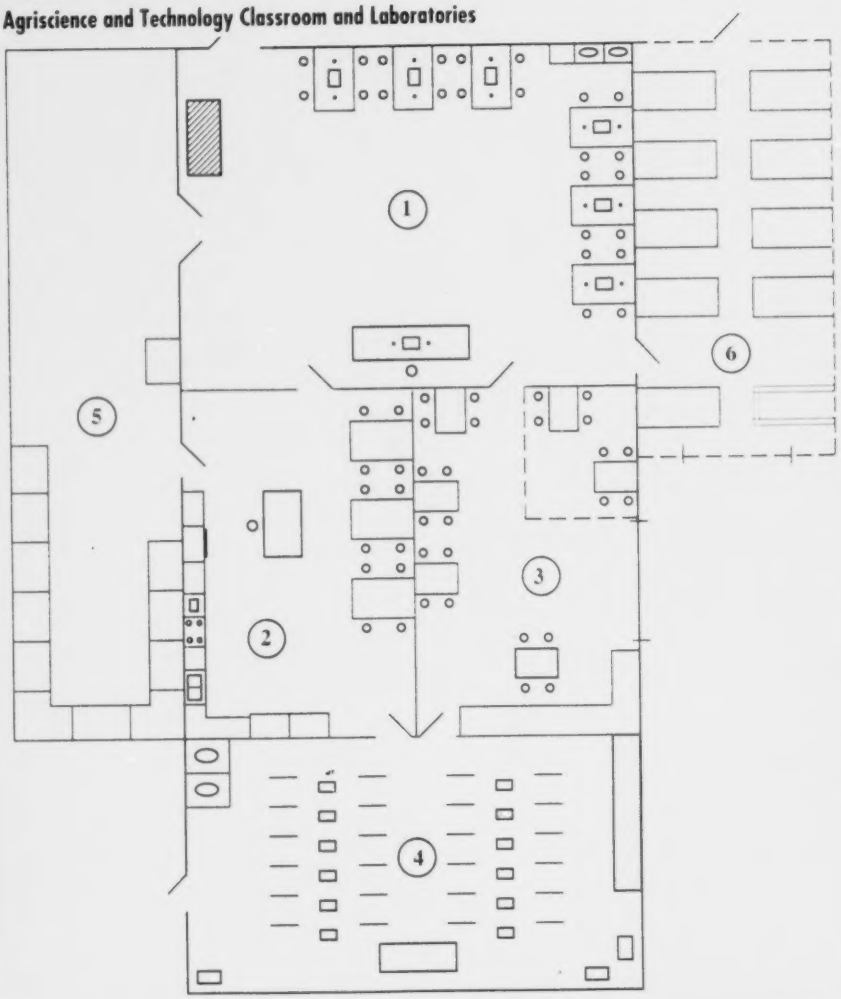
Figure 1

Agriscience and Technology Classroom and Laboratories



This diagram of a laboratory and classroom (Figure 1) has been designed to help agricultural education instructors visualize how their traditional shop might be updated to meet the new focuses of agricultural education. The rooms are labeled as follows:

1. Biology/Chemistry Laboratory
2. Food Science Laboratory
3. Physical Science Laboratory
4. Classroom/Agribusiness Laboratory
5. Storage
6. Greenhouse/Plant Science Laboratory

As stated earlier, the basic 40' x 60' shop has been used as a starting point. The shop was then divided into four laboratories, combining biology and chemistry to allow for more space and flexibility. Each room is discussed in further detail as to their contents and purposes in the text.

4. Conventional Oven
5. Range
6. Dishwasher

Equipment

1. Electric Mixer
2. Blender
3. Slow Cooker
4. Food Grinder
5. Pressure Canner
6. Measuring Equipment
7. Knives and Cutting Tools
8. Mixing Tools
9. Baking Tools
10. Cooking Tools
11. Canning Jars
12. Kitchen Aids
13. Cookware

3. Physical Science Laboratory

The Physical Science Laboratory is set up in stations, each station having one table for four people. The work areas are slightly smaller than in the first two laboratories to allow for fewer students working on different projects in each area. Located on the right-hand side of the room is a ten foot roll-up door to allow for larger equipment to be brought in if necessary. The remaining room is set aside for cabinets, storage space, and counter tops for electronic equipment. The dotted line represents a possible isolation area for activities such as welding and metalworking.

Facilities

1. First aid kit to treat minor injuries—one per lab room
2. Solvent storage cans—as needed
3. Chemical storage cabinets (specifications to satisfy state requirements) to separate acids, solvents, and corrosives—one of each per lab room
4. Buckets to transport jugs of acid and other hazardous reagents—two per lab room
5. Sinks with running water and drains—as needed for stations
6. Lab bench space—as needed for stations

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7. Natural gas or atmospheric air outlet on lab bench top—as needed for stations
8. 115-volt ac duplex electrical outlet on lab bench top, one for every two students
9. Counter space or wall rack to dry lab glassware—one per lab room
10. Paper towel holder at each large sink
11. Storage cabinets for glassware and microscopes
12. Clock with sweep second hand
13. Oxy-actylene Welder
14. Electric Welder
15. Venting as needed

Equipment

1. Safety goggles
2. Welding equipment
3. Temperature measuring equipment
4. Electronic testing equipment
5. Electrical testing equipment
6. Hydraulic control set with cylinder
7. Air control set with cylinder
8. Resistance apparatus
9. Torque assembly
10. Air flow apparatus
11. Spring assembly
12. Screw assembly
13. Earth materials kit
14. Evaporation apparatus
15. Weather chart
16. Weather board
17. Heat radiation and absorption apparatus
18. Hand tools
19. Balance beams
20. Power tools
21. Supplies as needed, determined by student activities

4. Classroom/Agribusiness Laboratory

The classroom also has space for 24 students. There is a computer for every two students positioned between their desks. A main computer is located at the left front of the room, along with a laser printer and plotter at the right front. The shaded box to the right is a reference/resource section. There are two restrooms to the left rear of the room.

Facilities

1. Chalkboard
2. Running water
3. Gas
4. Demonstration table
5. Bulletin board
6. Cabinet space
7. Computer tables and chairs
8. Writing tables
9. Computer demonstration monitor and network
10. Storage room
11. Magazine rack
12. Notebook rack
13. Bulletin files
14. Sink
15. Exhibit or display cases

Equipment

1. Bookcases
2. Steel file cabinets
3. Chart cabinet
4. Telephone
5. Video player and monitor
6. Overhead projector
7. Slide projector
8. Computers
9. Computer printers
10. Agribusiness Software
11. LCD display

5. Storage

There is not much detail given to the storage area. Permanent cabinetry is located at one end of the room. The box to the side of the Biology/Chemistry Laboratory is a refrigerator for materials from the greenhouse. The remaining space is designated for movable storage cabinets. These cabinets can be purchased or made as a class project. The cabinets can be made with drawers, shelves, or hooks. They would enable the instructor to store tools, equipment, or specific project materials and kits and to transport them easily to the appropriate area.

6. Greenhouse/Plant Science Laboratory

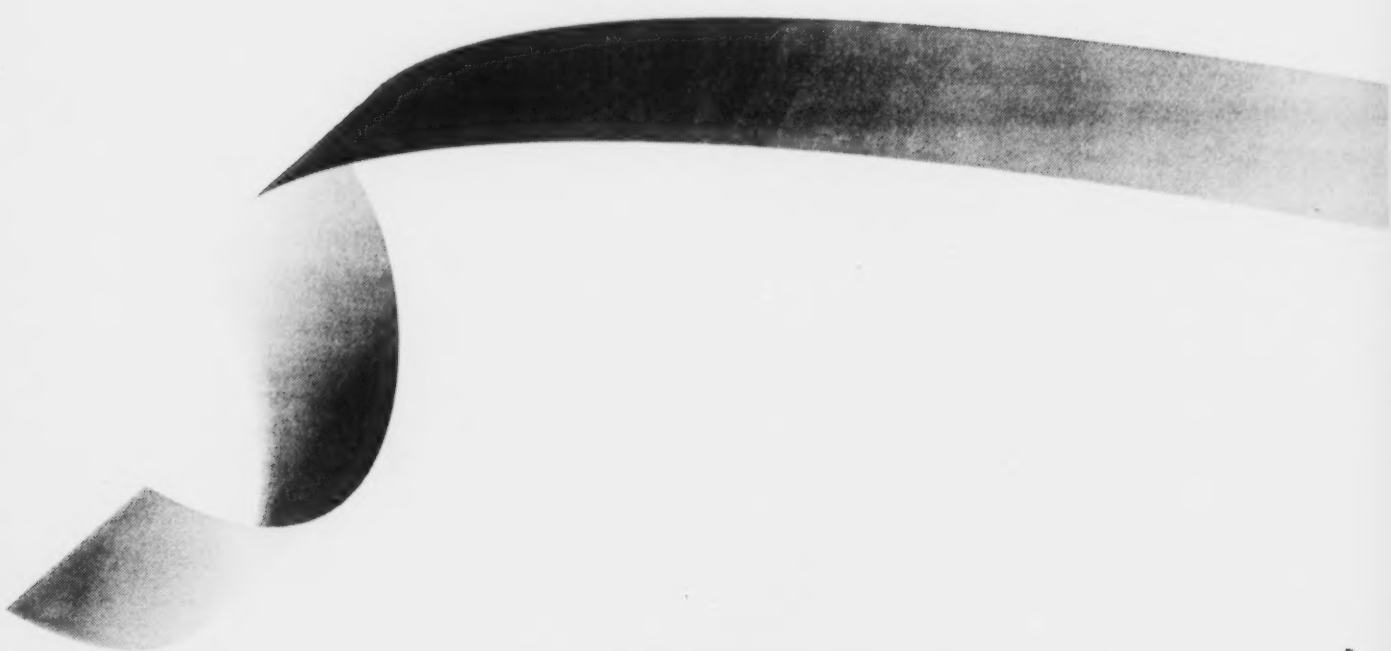
Within the greenhouse are ten 4' × 7' plant tables to be used as needed. The hydroponics equipment is set up on the bottom right-hand table. The greenhouse has an entrance from the Biology/Chemistry laboratory and from the outside, along with a 9 ½' roll-up door.

Summary

As with the Illinois Plan for Agricultural Education: A Planning Guide, the Implementation Guide was also prepared to assist administrators and instructors as they design new forward-looking agricultural education programs.

The Planning Guide helps those responsible for program planning to conceptualize both the role and function of agricultural education in a modern technological society. The Implementation Guide helps those responsible for implementing new programs and curricula which serve a variety of clientele needs.

When properly implemented and nurtured, the programs envisioned in the Illinois Plan for Agricultural Education will meet the needs of future employees in the Illinois Food and Fiber System for many years to come.



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A P P E N D I X A

Classification of Core Problem Areas According to Primary Emphasis and Level of Instruction

	Problem Area	Primary Emphasis* AO	AT	AS	AL	Level of Instruction Orient.	Prep.
IA1.	Identifying Careers in Agriculture - Horticulture	■	■	■		■	
IA2.	Recognizing the Role of Agriculture in Society		■		■	■	
IA3.	Understanding the Relationship Between Agriculture and the Environment			■	■	■	
IA4.	Identifying and Using Agricultural Organizations, Agencies, and Sources of Information About Agriculture	■	■		■	■	
IA5.	Understanding the World Food and Fiber Chain			■	■	■	
IA6.	Recognizing the Role of Research and Development in Agriculture			■	■		■
IA7.	Recognizing the Impact of Technology on Agriculture: Biotechnology		■		■		■
IA8.	Recognizing the Impact of Technology on Agriculture: Electronics		■		■		■
IB1.	Developing Communications Skills in Agriculture	■	■				■
IB2.	Applying Mathematics Skills in Agriculture	■	■				■
IB3.	Developing Human Relations Skills in Agriculture	■	■				■
IB4.	Developing Problem Solving Skills in Agriculture	■	■				■
IB5.	Developing Transition Skills in Agriculture	■	■				■
IB6.	Identifying and Practicing Ethics in Agricultural Occupations	■	■			■	
IB7.	Gaining Employment in an Agricultural Occupation	■	■				■
IB8.	Developing Safe Work Habits in Agricultural Occupations	■	■				■
IC1.	Understanding Basic Soil Science Principles	■	■	■	■	■	
IC2.	Identifying and Using Agricultural Tools and Equipment	■	■			■	
IC3.	Understanding Basic Genetics and Reproduction			■		■	
IC4.	Using Energy Efficiently		■		■	■	
IC5.	Identifying Basic Principles of Plant Science	■	■	■	■	■	
IC6.	Identifying Basic Principles of Animal Science	■	■	■	■	■	
IC7.	Identifying Basic Principles of Electricity	■	■	■	■	■	
IC8.	Understanding and Using Pesticides	■	■	■	■	■	
IC9.	Identifying Basic Agricultural Mechanics Principles	■	■	■	■	■	
IC10.	Conserving Agricultural Resources	■	■		■	■	
IC11.	Understanding Food Science Technology		■		■	■	
ID1.	Keeping and Using Records in Agricultural Occupations	■	■				■
ID2.	Applying Basic Economic Principles in Agribusiness	■	■				■
ID3.	Developing Basic Microcomputer Skills	■	■			■	
ID4.	Understanding Basic Business Organization	■	■				■
ID5.	Managing Personal Finances	■	■				■

*Primary Emphasis:
AO—Agricultural Occupations; AT—Agricultural Technology; AS—Agricultural Science; AL—Agricultural Literacy

Problem Area	Primary Emphasis*				Level of Instruction	
	AO	AT	AS	AL	Orient.	Prep.
IE1. Understanding the History and Organization of FFA	■	■			■	
IE2. Recognizing Opportunities in FFA	■	■			■	
IE3. Developing Leadership Skills Through Youth Organizations	■	■			■	
IE4. Participating in Community and Government Leadership	■	■				■
IF1. Understanding the Structure and Purposes of SAE	■	■				■
IF2. Planning and Developing SAE Programs	■	■				■
IF3. Expanding my SAE	■	■				■
IIA1. Marketing Agricultural Products and Services	■	■		■		■
IIA2. Financing the Agribusiness	■	■				■
IIA3. Understanding Agricultural Law Applications	■	■		■		■
IIA4. Insuring the Agribusiness	■	■				■
IIA5. Planning and Organizing the Agribusiness	■	■				■
IIA6. Advertising and Selling Agricultural Products and Services	■	■		■		■
IIA7. Operating the Agribusiness	■	■				■
IIA8. Managing Entrepreneurship Opportunities in Agriculture	■	■				■
IIA9. Identifying Career Opportunities in Agribusiness Management	■	■	■			■
IIA10. Using Microcomputers in Agribusiness Management	■	■	■	■		■
IIB1. Understanding the Animal Production Industry				■	■	
IIB2. Classifying Animals	■	■				■
IIB3. Understanding Animal Anatomy and Physiology	■		■		■	
IIB4. Meeting Nutritional Needs of Animals	■	■	■			■
IIB5. Understanding Animal Breeding a ' Reproduction	■	■	■			■
IIB6. Maintaining Animal Health	■	■	■			■
IIB7. Meeting the Environmental Requirements of Animals	■	■				■
IIB8. Identifying Alternative Animal Production Systems: Aquaculture	■	■	■			■
IIB9. Conserving Wildlife Resources		■			■	
IIB10. Caring for Animals	■					■
IIB11. Identifying Career Opportunities in Animal Science	■	■	■		■	
IIB12. Understanding Economic Principles of Livestock Production		■		■		■
IIC1. Enhancing Soil Fertility	■	■				■
IIC2. Preventing Soil Erosion and Managing Land	■	■				■
IIC3. Classifying Soils	■	■	■			■
IIC4. Classifying Plants	■	■	■			■
IIC5. Propagating Plants	■	■	■			■
IIC6. Understanding Plant Germination, Growth, and Development	■	■	■			■
IIC7. Controlling Plant Pests	■	■				■
IIC8. Maintaining Grain Quality	■	■				■
IIC9. Identifying Career Opportunities in Plant and Soil Science	■	■	■			■
IIC10. Identifying Alternative Crop Production Systems		■			■	
IID1. Processing Agricultural Products		■	■			■
IID2. Adhering to Government Regulations		■				■
IID3. Meeting Nutritional Needsof Food Consumers		■		■		■
IID4. Packaging and Distributing Food Products		■		■		■
IID5. Identifying Career Opportunities in Food Science		■	■			■

	Problem Area	Primary Emphasis*				Level of Instruction	
		AO	AT	AS	AL	Orient.	Prep.
IIE1.	Welding and Metalworking	■					■
IIE2.	Designing, Building, and Maintaining Agricultural Structures		■		■		■
IIE3.	Repairing and Maintaining Agricultural Equipment		■				■
IIE4.	Understanding and Maintaining Small Engines	■					■
IIE5.	Financing and Managing Agricultural Equipment		■				■
IIE6.	Manufacturing, Distributing, Selling, and Servicing Agricultural Equipment		■		■		■
IIE7.	Identifying Career Opportunities in Agricultural Engineering/Mechanization	■	■			■	
IIIA1.	Marketing Horticultural Products and Services		■		■		■
IIIA2.	Financing the Horticultural Business		■				■
IIIA3.	Insuring the Horticultural Business		■				■
IIIA4.	Planning and Organizing the Horticultural Business		■				■
IIIA5.	Advertising and Selling Horticultural Products		■		■		■
IIIA6.	Operating the Horticultural Business		■				■
IIIB1.	Propagating Plants	■		■		■	
IIIB2.	Understanding Plant Germination, Growth, and Development	■	■	■		■	
IIIB3.	Classifying Horticultural Plants	■		■		■	
IIIB4.	Understanding Plant Anatomy and Physiology	■		■		■	
IIIB5.	Growing Ornamental Plants	■					■
IIIB6.	Growing Vegetables	■				■	
IIIB7.	Growing Fruits						■
IIIB8.	Processing Fruits and Vegetables		■				■
IIIB9.	Controlling Plant Pests	■	■				■
IIIB10.	Enhancing Soil Fertility	■	■				■
IIIB11.	Developing Growing Media	■				■	
IIIB12.	Growing Plants Hydroponically	■	■	■		■	
IIIC1.	Designing, Building, and Maintaining Horticultural Structures		■		■		■
IIIC2.	Utilizing Energy Alternatives		■	■	■		■
IIIC3.	Repairing and Maintaining Small Engines	■					■
IIIC4.	Repairing, Maintaining, and Operating Horticultural Equipment		■				■
IIID1.	Designing and Drawing Landscape Plans	■	■				■
IIID2.	Establishing and Maintaining Turf Areas	■	■				■
IIID3.	Transplanting and Maintaining Landscape Plants	■	■			■	
IIID4.	Surveying, Grading, and Tiling	■	■				■
IIID5.	Interior Plantscaping	■	■				■
IIIE1.	Handling and Preparing Cut Flowers	■	■			■	
IIIE2.	Designing Silk and Dried Arrangements	■	■			■	
IIIE3.	Designing Live Arrangements	■	■			■	
IIIE4.	Identifying the Principles of Floral Design	■	■			■	

Problem Area	Primary Emphasis*				Level of Instruction	
	AO	AT	AS	AL	Orient.	Prep.
IVA1. Conserving Water Resources		■		■	■	
IVA2. Controlling Air Pollution		■		■	■	
IVA3. Understanding Government Regulations and Controls		■		■	■	
IVA4. Managing Land Resources	■	■		■	■	
IVA5. Managing Freshwater Resources		■		■	■	
IVB1. Classifying Trees	■					■
IVB2. Identifying Trees and Forestry Products	■			■		■
IVB3. Managing Forestry Resources		■		■		■
IVB4. Producing Christmas Trees		■				■
IVB5. Processing Forest Products		■				■
IVC1. Classifying Fish	■	■		■		■
IVC2. Stocking Fish	■	■				■
IVC3. Feeding Fish	■	■				■
IVC4. Managing Fish Ponds	■	■				■
IVC5. Classifying Game Birds and Animals	■	■		■		■
IVC6. Feeding Game Birds and Animals	■	■				■
IVC7. Controlling Wildlife Pests	■	■				■
IVC8. Raising Game Birds and Animals	■	■				■
IVC9. Maintaining Wildlife Habitat	■	■		■		■
IVD1. Managing Game Preserves		■				■
IVD2. Managing Hunting and Fishing Clubs		■				■
IVD3. Practicing Hunting Safety	■				■	
IVD4. Identifying Outdoor Recreational Enterprises		■			■	
IVD5. Adhering to Laws and Regulations		■			■	
IVD6. Managing Golf Courses		■				■
IVD7. Managing Parks and Recreational Areas		■				■

A P P E N D I X B

State Goals for Learning Addressed by Core Curriculum Problem Areas

Problem Area	Sciences 1 2 3 4	Social Sciences 1 2 3 4 5	Language Arts 1 2 3 4 5 6	Math 1 2 3 4 5 6 7	Physical Develop/Health 1 2 3 4 5 6 7
IA1. Identifying Careers in Agriculture/Horticulture		■			
IA2. Recognizing the Role of Agriculture in Society		■■			
IA3. Understanding the Relationship Between Agriculture and the Environment	■■	■			
IA4. Identifying and Using Agricultural Organizations, Agencies, and Sources of Information About Agriculture	■	■	■■		
IA5. Understanding the World Food and Fiber Chain		■			
IA6. Recognizing the Role of Research and Development in Agriculture	■■■■		■■		
IA7. Recognizing the Impact of Technology on Agriculture: Biotechnology	■■ ■				
IA8. Recognizing the Impact of Technology on Agriculture: Electronics	■	■	■		
IB1. Developing Communications Skills in Agriculture			■■■■ ■		
IB2. Applying Mathematics Skills in Agriculture	■■■■	■■■			
IB3. Developing Human Relations Skills in Agriculture	■	■			
IB4. Developing Problem Solving Skills in Agriculture		■	■ ■		
IB5. Developing Transition Skills in Agriculture		■			
IB6. Identifying and Practicing Ethics in Agricultural Occupations		■ ■			
IB7. Gaining Employment in an Agricultural Occupation		■	■■■■■		
IB8. Developing Safe Work Habits in Agricultural Occupation		■	■■		
IC1. Understanding Basic Soil Science Principles	■■				
IC2. Identifying and Using Agricultural Tools and Equipment	■	■			
IC3. Understanding Basic Genetics and Reproduction	■■■				
IC4. Using Energy Effectively	■■ ■				
IC5. Identifying Basic Principles of Plant Science	■ ■				
IC6. Identifying Basic Principles of Animal Science	■■ ■				
IC7. Identifying Basic Principles of Electricity	■ ■■			■	
IC8. Understanding and Using Pesticides	■■■■	■			
IC9. Identifying Basic Agricultural Mechanics Principles	■■				

Problem Area	Sciences 1 2 3 4	Social Sciences 1 2 3 4 5	Language Arts 1 2 3 4 5 6	Math 1 2 3 4 5 6 7	Physical Develop/Health 1 2 3 4 5 6 7
IC10. Conserving Agricultural Resources	■■ ■	■			
IC11. Understanding Food Science Technology	■■			■	
ID1. Keeping and Using Records in Agricultural Occupations		■			
ID2. Applying Basic Economic Principles in Agribusiness		■			
ID3. Developing Basic Microcomputer Skills		■			
ID4. Understanding Basic Business Organization		■			
ID5. Managing Personal Finances		■			
IE1. Understanding the History and Organization of FFA		■			
IE2. Recognizing Opportunities in FFA		■			
IE3. Developing Leadership Skills Through Youth Organizations		■	■		
IE4. Participating in Community and Government Leadership		■			
IF1. Understanding the Structure and Purposes of SAE			■ ■		
IF2. Planning and Developing SAE Programs				■■■	
IF3. Expanding my SAE				■ ■	
IIA1. Marketing Agricultural Products and Services	■	■ ■		■	
IIA2. Financing the Agribusiness		■		■ ■	
IIA3. Understanding Agricultural Law Applications		■	■ ■ ■		
IIA4. Insuring the Agribusiness		■			
IIA5. Planning and Organizing the Agribusiness		■	■		
IIA6. Advertising and Selling Agricultural Products and Services		■	■■■	■■■	
IIA7. Operating the Agribusiness		■	■■■■		
IIA8. Managing Entrepreneurship Opportunities in Agriculture		■			
IIA9. Identifying Career Opportunities in Agribusiness Management		■	■		
IIA10. Using Microcomputers in Agribusiness Management		■		■■■	
IIB1. Understanding the Animal Production Industry	■	■			
IIB2. Classifying Animals	■ ■				
IIB3. Understanding Animal Anatomy and Physiology	■ ■				
IIB4. Meeting Nutritional Needs of Animals	■■			■	
IIB5. Understanding Animal Breeding and Reproduction	■■■				
IIB6. Maintaining Animal Health	■ ■				

Problem Area	Sciences 1 2 3 4	Social Sciences 1 2 3 4 5	Language Arts 1 2 3 4 5 6	Math 1 2 3 4 5 6 7	Physical Develop/Health 1 2 3 4 5 6 7
IIB7. Meeting the Environmental Requirements of Animals	■■■	■			
IIB8. Identifying Alternative Animal Production Systems: Aquaculture	■	■■			
IIB9. Conserving Wildlife Resources	■■	■ ■			
IIB10. Caring for Animals	■				
IIB11. Identifying Career Opportunities in Animal Science	■				
IIB12. Understanding Economic Principles of Livestock Production		■ ■			
IIC1. Enhancing Soil Fertility	■■				
IIC2. Preventing Soil Erosion and Managing Land	■■	■			
IIC3. Classifying Soils	■ ■				
IIC4. Classifying Plants	■ ■				
IIC5. Propagating Plants	■■				
IIC6. Understanding Plant Germination, Growth, and Development	■				
IIC7. Controlling Plant Pests	■ ■				
IIC8. Maintaining Grain Quality	■	■			
IIC9. Identifying Career Opportunities in Plant and Soil Science	■	■			
IIC10. Identifying Alternative Crop Production Systems	■■ ■				
IID1. Processing Agricultural Products	■■■				
IID2. Adhering to Government Regulations		■			
IID3. Meeting Nutritional Needsof Food Consumers	■				
IID4. Packaging and Distributing Food Products	■■■				
IID5. Identifying Career Opportunities in Food Science	■	■			
IIE1. Welding and Metalworking	■■				
IIE2. Designing, Building, and Maintaining Agricultural Structures				■■■	
IIE3. Repairing and Maintaining Agricultural Equipment			■ ■	■■■	
IIE4. Understanding and Maintaining Small Engines	■ ■■	■		■	
IIE5. Financing and Managing Agricultural Equipment			■■■	■■■	
IIE6. Manufacturing, Distributing, Selling, and Servicing Agricultural Equipment	■	■■	■	■	
IIE7. Identifying Career Opportunities in Agricultural Engineering/Mechanization	■	■			
IIIA1. Marketing Horticultural Products and Services					
IIIA2. Financing theHorticultural Business		■		■ ■	

Problem Area	Sciences 1 2 3 4	Social Sciences 1 2 3 4 5	Language Arts 1 2 3 4 5 6	Math 1 2 3 4 5 6 7	Physical Develop./Health 1 2 3 4 5 6 7
IIIA3. Insuring the Horticultural Business		■			
IIIA4. Planning and Organizing the Horticultural Business		■	■		
IIIA5. Advertising and Selling Horticultural Products		■	■■■	■■■	
IIIA6. Operating the Horticultural Business		■	■■■■		
IIIB1. Propagating Plants	■ ■				
IIIB2. Understanding Plant Germination, Growth, and Development	■ ■				
IIIB3. Classifying Horticultural Plants	■				
IIIB4. Understanding Plant Anatomy and Physiology	■				
IIIB5. Growing Ornamental Plants					
IIIB6. Growing Vegetables	■				
IIIB7. Growing Fruits	■			■■	
IIIB8. Processing Fruits and Vegetables	■■				
IIIB9. Controlling Plant Pests	■ ■	■			
IIIB10. Enhancing Soil Fertility	■				
IIIB11. Developing Growing Media	■■				
IIIB12. Growing Plants Hydroponically	■■				
IIIC1. Designing, Building, and Maintaining Horticultural Structures				■■■	
IIIC2. Utilizing Energy Alternatives					
IIIC3. Repairing and Maintaining Small Engines	■ ■■	■		■	
IIIC4. Repairing, Maintaining, and Operating Horticultural Equipment			■ ■	■■■	
IIID1. Designing and Drawing Landscape Plans			■■		
IIID2. Establishing and Maintaining Turf Areas			■		
IIID3. Transplanting and Maintaining Landscape Plants	■				
IIID4. Surveying, Grading, and Tiling	■		■		
IIID5. Interior Plantscaping	■■		■		
IIIE1. Handling and Preparing Cut Flowers		■			
IIIE2. Designing Silk and Dried Arrangements			■■■	■	
IIIE3. Designing Live Arrangements			■		
IIIE4. Identifying the Principles of Floral Design			■	■	

Problem Area	Sciences 1 2 3 4	Social Sciences 1 2 3 4 5	Language Arts 1 2 3 4 5 6	Math 1 2 3 4 5 6 7	Physical Develop/Health 1 2 3 4 5 6 7
IVA1. Conserving Water Resources	■■	■■			
IVA2. Controlling Air Pollution	■■	■ ■			
IVA3. Understanding Government Regulations and Controls	■	■			
IVA4. Managing Land Resources	■	■ ■■			
IVA5. Managing Freshwater Resources	■■	■■			
IVB1. Classifying Trees	■ ■				
IVB2. Identifying Trees and Forestry Products	■	■		■ ■	
IVB3. Managing Forestry Resources	■■	■■			
IVB4. Producing Christmas Trees	■■	■■			
IVB5. Processing Forestry Products	■■	■			
IVC1. Classifying Fish	■■	■			
IVC2. Stocking Fish	■■	■			
IVC3. Feeding Fish	■■	■			
IVC4. Managing Fish	■■■	■			
IVC5. Classifying Game Birds and Animals	■■	■			
IVC6. Feeding Game Birds and Animals	■■				
IVC7. Controlling Wildlife Pests	■■	■			
IVC8. Raising Game Birds and Animals	■■	■■			
IVC9. Maintaining Wildlife Habitat	■■■	■			
IVD1. Managing Game Preserves	■■■	■			
IVD2. Managing Hunting and Fishing Clubs	■	■■			
IVD3. Practicing Hunting Safety		■			
IVD4. Identifying Outdoor Recreational Enterprises	■	■			
IVD5. Adhering to Laws and Regulations	■	■			
IVD6. Managing Golf Courses	■	■		■■	
IVD7. Managing Parks and Recreational Areas		■ ■■			

A P P E N D I X C

Matrix of Core Problem Areas with Occupational Tasks

Agricultural Business and Management Cluster Matrix

Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
Formulating Livestock Feeding Programs				
105A001 Evaluate livestock production records	B1	B2		
105A002 Assess livestock needs, such as growing and fattening, nursing, production or special nutritional needs	B1 C3 C6	B3 B4 B5 D3		C3
105A003 Identify feed formula for livestock needs	B1	B4 B10 D3		C3
105A004 Balance rations	A4 B1 B2	B4 B10 D3		
105A005 Substitute feed ingredients	B1	B4 B10		
105A006 Mix feed additives and medications	B1	B4 B6 B10		C3
105A007 Analyze feed nutritional value	B1 B2	B4 B10		
105A008 Compute feed cost per pound gain	A4 B1 B2	B4		
105A009 Evaluate feeding program	B1	B4 D3		
105A010 Plan feeding program	B1	B4 B10 D3		
105A011 Record daily feed consumption	B1	B4		C3
Performing Sales Duties				
105B001 Determine customer needs	B1	A6 E3 E6		
105B002 Locate merchandise	B1	A6		
105B003 Compute sales tax	B1 B2	A6 E3		
105B004 Complete sales slip	B1 B2	A6 E3		
105B005 Inform customer of warranty and guarantee specifications	B1 E4	A6 E3		
105B006 Close sale	B1 B2	A6 E6		
105B007 Conduct sale	B1 B2	A6		
105B008 Complete business forms	B1 B2	A6 E3		
105B009 Communicate orally with clients	B1	A6 E3		
105B010 Explain federal and state laws regarding the grain elevator business	B1 E4	A3		
105B011 Explain legal responsibilities of business which deal with interstate commerce	A2 B1 E4	A3 E2		
105B012 Develop hedging programs appropriate for grain elevator business	B1 B2			
105B013 Determine potential volume of grain produced in trade territory using crop reports	A2 B1 B2			
105B014 Determine the possible returns from different methods of marketing grain	B1 B2			
105B015 Explain the relationship of cash grain prices to futures markets	B1 B2 E4			
105B016 Develop basis chart for various commodities	A4 B1 B2			
105B017 Compute margins	B1 B2			
105B018 Price grain based on grade, weight and quality	B1 B2			
105B019 Compute markup	B1 B2	E3		

Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
Performing Sales-Related Duties				
105C001 Open store or department	B1	A6		
105C002 Process debit card sales transaction	B1 B2	A6		
105C003 Process charge card sales transaction	B1 B2	A6		
105C004 Package customer purchase	B1	A6 D4		
105C005 Arrange delivery of merchandise	B1	A6 D4		
105C006 Process customer complaints	B1	A6 E3		
105C007 Close out cash register	B1 B2	A6		
105C008 Close store or department	B1	A6		
105C009 Process customer refund on sale	B1 B2	A6		
105C010 Process cash sales transaction	B1 B2	A6		
105C011 Order supplies and stock	B1	A6		
105C012 Process incoming order	B1	A6		
105C013 Return unuseable merchandise	B1	A6		
105C014 Code and date merchandise	B1	A6		
105C015 Label and price merchandise	B1 B2	A6		
105C016 Update prices on merchandise	B1 B2	A6		
105C017 Stock merchandise displays	B1	A6		
105C018 Store merchandise in storage area	B1	A6		
105C019 Rotate supplies and stock	B1	A6		
105C020 Greet and meet people	B1	A6		
105C021 Weigh grain as it arrives at the elevator	B1 B2			
105C022 Use balances, moisture testers, screens and dockage machines in grading grain	B1 B2			
105C023 Draw representative sample of grain from truck or railroad car	B1			
105C024 Grade grain according to USDA Grain Standards Act	B1			
105C025 Blend various qualities of grain to meet grade standards	B1			
105C026 Label seed in accordance with state laws	B1	A3		
105C027 Supply parts to service shop	B1	E3		
105C028 Use microfiche to determine part number	B1 B2			
105C029 Use microfiche to determine part availability	B1	E3		
105C030 Use parts catalog to determine part number	B1	E3		
105C031 Use computer inventory system to determine part availability	B1 D3	E3		
Marketing Animals and Animal Products				
105D001 Plan marketing schedule	A2 B1	B5 B10		
105D002 Select markets	B1 B2	B10		
105D003 Sort and mark animals for market	B1	B2		C1 C5
Performing Promotional Activities				
105E001 Maintain customer file system	B1	A6	A5	
105E002 Plan territory management	A2 B1	A1 A6	A5	
105E003 Analyze and interpret market information	A2 B1 B2	A1 A6	A5	
105E004 Prepare advertisements	B1	A6	A5	
105E005 Conduct sales promotional meetings	B1 E4	A6	A5	
105E006 Identify potential buyers	B1	A1 A6	A5	
105E007 Provide technical assistance to customers	B1	A6	A5	
105E008 Plan a sales promotional meeting	B1 E4	A6	A5	
105E009 Build merchandise displays	B1	A6	A5	
105E010 Calculate customer discount	B1	A6	A5	

Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
Financing the Agribusiness				
105F001 Calculate net worth of machinery	A4 B1 B2	E5		
105F002 Calculate net worth of animals	A4 B1 B2			
105F003 Calculate net worth of land	A4 B1 B2			
105F004 Calculate operating expenses	A4 B1 B2 D5	A2 A4 A8 E5		
105F005 Prepare cash flow projections	A4 B1 B2 D1 D5	A2 A6 A8 A10	A5	
105F006 Prepare financial statements	A4 B1 B2 D1 D5	A2 A10		
105F007 Interpret financial statements	A4 B1 B2 D1 D5	A2		
105F008 Prepare budget	A4 B1 B2 D5	A2 A8 A10		
105F009 Develop credit plan	B1 B2 D5	A2 A6	A5	
105F010 Complete business loan application process	B1 B2	A2		
105F011 Prepare tax statements	B1 B2 D5	A2 A6	A5	
105F012 Calculate insurance needs	B1 B2	A4 A6 A8		
105F013 Prepare depreciation schedule	B1 B2 D5	A2 A6 E5	A5	
105F014 Prepare bank deposits	B1 B2			
105F015 Prepare cash flow statement	B1 B2 D1 D5	A2 A6	A5	
105F016 Record accounts payable in computerized bookkeeping system	B1 B2 D3	A6 A10	A5	
105F017 Record accounts receivable in computerized bookeeping system	B1 B2 D3	A6 A10	A5	
105F018 Balance charge receipts and cash tickets	B1		A5	
Performing General Office Work				
105G001 Establish filing system	B1	A6		
105G002 Establish file index	B1	A6		
105G003 File materials, such as receipts, letters, documents, specifications and orders	B1	A6		
105G004 Write field reports (prepare reports)	B1	A6		
105G005 Type reports	B1	A6		
105G006 Process incoming mail	B1	A6		
105G007 Process outgoing mail	B1	A6		
105G008 Maintain mailing lists	B1	A6		
105G009 Schedule appointments and meetings	B1	A6		
105G010 Process incoming telephone calls	B1	A6		
105G011 Process outgoing telephone calls	B1	A6		
105G012 Duplicate materials	B1	A6		
105G013 Clean work area	B1	A6		
105G014 Make minor office equipment repairs	B1	A6		
105G015 Read crop pest management calendar	B1 B2			
105G016 Collect pest samples for laboratory analysis	B1			
105G017 Read livestock pest management calendar	B1 B2			
105G018 Admit animals to clinic	B1			
105G019 Discharge animals from clinic	B1			
105G020 Notify clients of appointments	B1			
Managing the Business				
105H001 Conduct periodic inspection of merchandise	B1	A6 A7 B6		
105H002 Conduct inventory of merchandise	B1 B2	A6 A7 B6 E6		
105H003 Maintain inventory records	B1 B2	A6 A7 B4 B6		
105H004 Plan work schedule	B1	A6 A7		
105H005 Determine labor needs	B1 B2 D4	A5 A7		
105H006 Evaluate employee performance	B1 E3	A5 A7		
105H007 Maintain quality control records	B1 B2	A7		
105H008 Evaluate agribusiness productivity	B1 B2 C3 D2 E3	A1 A5 A7 B5 E4		

Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
105H009 Supervise agriculture workers	B1 B6 E3	A5		
105H010 Prepare payroll	B1 B2			
105H011 Calculate payroll deductions	B1 B2	A4		
105H012 Maintain production records	B1 B2 C3 D4	B5		
105H013 Maintain animal records	B1 B2 C3 D4	B5		C1 C5
105H014 Maintain equipment records	B1 B2 D4	E5		
105H015 Develop land use program	B1 C10	C2 C10		
105H016 Follow time management schedule	B1 B6			
105H017 Follow work schedules	B1 B6			
105H018 Purchase machinery and equipment	B1 B2	A7 B6 E6		
105H019 Select computer software for records and reports	B1 B2 D3	A2		
105H020 Select computer software for livestock management decisions	A4 B1 B2 D2 D3			
105H021 Select computer software for crop management decisions	A4 B1 B2 D2 D3	C2 C10		
105H022 Select computer software for machinery management decisions	A4 B1 B2 D2	E5		
105H023 Utilize a computerized network on agricultural marketing and management	A4 B1 B2 D2 D3			
105H024 Utilize computerized inventory control system	B1 B2 D3	A6 A10 E6		
105H025 Establish computerized inventory control system	B1 B2 D3	A6 A10		
105H026 Examine returned parts for defects	B1			
105H027 Receive new shipment of parts based on packing slip	B1			
105H028 Use computer software for records and reports	A4 B1 B2 D3	A1 A2 A10		
105H029 Use computerized inventory system	B1 B2 D3	A10		
Assembling, Servicing and Maintaining Equipment and Facilities				
105I001 Service business vehicle	B1 C2			
105I002 Service conveyor equipment	B1 C2			
105I003 Clean and fumigate storage facility	B1	C8	B9	
105I004 Maintain hand tools	B1 C2 C7	B5 B6 E4		
105I005 Service electrical outlets and extensions	B1 C7			
105I006 Assemble planting equipment	B1 B2			
105I007 Assemble tillage equipment	B1 B2			
105I008 Perform maintenance checks on equipment	B1 B2 C2 C7	B6 E4		
105I009 Calibrate equipment	B1 B2			
105I010 Maintain service records	B1 B2			
105I011 Assemble applicating pumps	B1 B2			
105I012 Assemble boom type chemical equipment	B1 B2			
105I013 Change cartridge air filters	B1	E4		
105I014 Change nozzles on applicators	B1			
105I015 Check working condition of respirator	B1			
105I016 Clean granular application equipment	B1			
105I017 Clean liquid application equipment	B1			
105I018 Lubricate equipment	B1 C7	E4		
105I019 Install spreader fan on shaft	B1			
105I020 Install drive wheel on applicating equipment	B1			
105I021 Paint equipment	B1			
105I022 Replace bearings	B1 C7	E4		

Occupational Task		Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
1051023	Replace belts	B1			
1051024	Replace booms	B1			
1051025	Replace drag chains	B1			
1051026	Replace impeller pump	B1			
1051027	Replace worn chain links	B1			
1051028	Replace universal joints	B1			
1051029	Repair electrical defects	B1 C7			
1051030	Troubleshoot equipment failure	B1 C7	E4		
1051031	Prepare equipment for off-season storage	B1			
1051032	Service fuel systems	B1 C2	E4		
1051033	Service electrical systems	B1 C2 C7	E4		
1051034	Service lubrication systems	B1 C2	E4		
1051035	Service cooling systems	B1 C2	E4		
1051036	Test engine compression	B1 B2	E4		
1051037	Repair equipment utilizing shielded metal arc welding	B1	E1		
1051038	Repair equipment utilizing oxy-fuel (OAW) equipment	B1	E1		
1051039	Cut and pierce metal utilizing OAW equipment	B1 B2	E1		
1051040	Cut and pierce metal utilizing SMAW equipment	B1 B2	E1		
1051041	Perform maintenance checks	B1	E1		
1051042	Paint applicating equipment	B1			
1051043	Care for and maintain scales	B1 B2			
1051044	Clean various surfaces		B5		
1051045	Disinfect pens, cages and runs	B1 B2	B5 C8		
1051046	Sterilize injection equipment	B1 B2	B5 B6		
1051047	Sterilize surgical instruments and equipment using autoclave method	B1 B2			
1051048	Sterilize surgical instruments and equipment using chemical method	B1 B2	B6		
1051049	Store surgical instruments and equipment	B1			
1051050	Wash drapes	B1			
1051051	Clean x-ray cassette	B1			
Applying Fertilziers and Chemicals					
105J001	Evaluate chemicals applied to test plots	B1 C10	C1 C7 C8 D3	B9	
105J002	Dispose of chemicals and containers according to manufacturersi specifications	B1 C10	C1 C7 C8	B9	
105J003	Prepare chemical program	B1 B2 C5 C10	C1 C6 C7 D3		
105J004	Calculate application rates	A4 B1 B2	C1 C7	B9	
105J005	Calculate proportions of chemical and carrving agents	B1 B2	C1 C7	B9	
105J006	Calibrate spraving equipment	B1 B2	C1		
105J007	Prepare fertilizer program	B1 B2 C5	C1		
105J008	Map chemical applications	B1 B2	C1 C7 C8		
105J009	Formulate fertilizer	A4 B1 B2	C1		
105J010	Test soil	B1	C1 C2		
105J011	Compute fertilizer costs	B1 B2	C1 C7		
105J012	Make fertilizer and lime recommendations	B1	C1		
105J013	Compute chemical costs	B1 B2	C1 C8	B9	
105J014	Identify fertilizer injury	B1	C1		
105J015	Time fertilizer and chemical applications	B1 B2	C1 C6 C7 C8	B9	
105J016	Maintain chemical files	B1 B2	C1 C7 C8	B9	

Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
Maintaining and Constructing Structures				
105K001 Plan building construction	B1 B2 C7	B7 E2		
105K002 Construct concrete floors and foundations	B1 B2	E2		
105K003 Construct wooden fence	B1 B2			
105K004 Construct wire fence	B1 B2			
105K005 Construct gates	B1 B2			
105K006 Install gates	B1			
105K007 Perform maintenance inspection of facilities	B1	A3 B7 C2 E2		
105K008 Repair roofing and gutters	B1	E2		
105K009 Repair siding	B1	E2		
105K010 Repair doors and entry ways	B1	E2		
105K011 Paint exterior surfaces of buildings	B1	E2		
105K012 Paint interior surfaces of buildings	B1	E2		
105K013 Repair and glaze windows and/or greenhouse lights	B1			
105K014 Service electrical systems of buildings	B1 C7	E2		
105K015 Maintain ventilation systems of buildings	B1			
105K016 Maintain water system	B1			
105K017 Service livestock feeding equipment	B1 C7			
105K018 Service livestock watering equipment	B1 C7			
105K019 Lay out building using transit	B1 B2	E2	D4	
105K020 Lay out conservation structures using transit	B1 B2	C2 E2	D4	
Growing Corn, Soybeans, Small Grains or Forage Crop				
105L001 Plan planting schedules	B1 B2 C1	C2 C6 C10		
105L002 Select seed varieties	B1 B2 C3	C2 C4 C6 C10		
105L003 Select planting date	B1 B2	C2 C6 C10		
105L004 Prepare seed bed	B1 C1	C2 C6		
105L005 Select planting method	B1 C1 C5 C10	C2 C6		
105L006 Plant seeds	B1 C2 C6			
105L007 Select pest control program	B1	C2 C7 C8	B9	
105L008 Monitor plant growth	B1 B2 C5	C2 C6 C8		
105L009 Spray crop for pest control	B1	C2 C7	B9	
105L010 Cultivate crop	B1 C5	C2 C6 C7		
105L011 Determine number of forage crop cuttings	B1 B2	C2		
Harvesting and Storing Crops				
105M001 Harvest beans, corn and small grains	B1			
105M002 Dry and store beans, corn and small grains	B1			
105M003 Harvest forage crops	B1			
105M004 Store forage crops	B1			
105M005 Monitor moisture content of stored crops	B1 B2	C8		
105M006 Determine marketing strategy	B1 B2	C8		
105M007 Transport crops to market	B1	C8		
105M008 Test grain for moisture content	B1 B2	C8		
105M009 Determine weight loss incurred in drying grain	B1 B2			
105M010 Determine cost of drying grain	B1 B2			
105M011 Identify various types of grain damage	B1			
105M012 Identify materials that contaminate grain due to odors	B1			
105M013 Identify sources of grain contamination	B1			

Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
105M014 Treat grain properly and safely for insect control without lowering quality	B1 B2			
105M015 Identify weeds and weed seeds commonly found in crops	B1			
105M016 Operate and read devices for detecting heating of grain in storage	B1 B2			
105M017 Use aeration, drying and turning techniques to preserve grain quality	B1			
Breeding, Handling and Caring for Animals				
105N001 Inseminate animals artificially	B1 B2 C6	B3 B5		
105N002 Pregnancy test animals	B1 B2 C6	B3 B5		
105N003 Assist animals in delivery	B1 C6	B3 B5		
105N004 Assist young to nurse	B1 C6	B3 B5 B10		
105N005 Castrate animals	B1 C6	B3 B5 B10		
105N006 Dehorn animals	B1 C6	B3 B10		
105N007 Control building temperature	B1 C7	B7 B10		
105N008 Control building ventilation	B1	B7 B10		
105N009 Control building lighting	B1	B7 B10		
105N010 Restrain animals	B1 C6	B3		
105N011 Evaluate animals for registry	B1 B2 C3	B2		
105N012 Mark or tag animals for identification	B1			C1 C5
105N013 Bathe animals	B1			
105N014 Clean ears	B1			
105N015 Clean teeth	B1			
105N016 Clip nails	B1			
105N017 Comb and brush animals	B1			
105N018 Drain anal sacs using the digital pressure method	B1			
105N019 Drain anal sacs using the rectal method	B1			
105N020 Exercise dogs	B1			
105N021 Feed animals using conventional method	B1	B4		
105N022 Feed animals using tube method	B1			
105N023 Induce bowel movements	B1			
105N024 Pluck hair from ear canals	B1			
Maintaining Animal Health				
105O001 Inspect animals for disease	B1 C6	B3 B6 B10		
105O002 Identify ailments in animals	B1	B6 B9 B10		
105O003 Administer medication	B1 B2 C6	B3 B6 B9 B10		
105O004 Control parasites (external or internal)	B1 B2	B6 B10		
105O005 Treat wounds	B1 C6	B3 B10		
105O006 Disinfect buildings and equipment	B1 B2	B5 B6 B10 C8		
105O007 Deworm animals	B1 B2	B10		
Scouting Fields for Weed, Diseasee Insect or Other Damage				
105P001 Scout fields for weeds	B1	C7	B9	
105P002 Map fields for weed location and severity of weed pressure	B1		B9	
105P003 Collect and prepare weed plant samples for laboratory identification	B1			
105P004 Identify weeds	B1	C1		
105P005 Scout fields for plant disease damage	B1		B9	
105P006 Collect plant disease specimens	B1		B9	
105P007 Identify plant diseases	B1	C7		

Occupational Task		Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
105P008	Scout fields for insect and pest damage	B1		B9	
105P009	Map fields for insect and pest damage location all severity of problem	B1		B9	
105P010	Identify crop insects and pests	B1	C7	B9	
105P011	Collect insect specimens for identification	B1		B9	
105P012	Estimate crop loss due to hail or insect damage	B1 B2			
105P013	Take and prepare soil samples for nematode identification	B1			
105P014	Complete plant specimen data form	B1			
105P015	Set out insect traps	B1			
105P016	Monitor insect traps	B1			
105P017	Estimate and monitor insect populations	B1 B2		B9	
105P018	Identify visually herbicide injury of plants	B1	C7		
105P019	Collect samples of herbicide injured plants	B1			
105P020	Identify visually injury of plants due to herbicide residues in the soil	B1	C7		
105P021	Keep records of scouting visits by completing scouting forms	B1 B2			
105P022	Collect plant tissue for nutrient analysis	B1			
105P023	Identify various crops	B1			
105P024	Determine crop rotations	B1			
105P025	Estimate crop yields	B1 B2			
105P026	Identify planting problems	B1			
105P027	Evaluate soil conditions	B1 C1			
105P028	Make recommendations for fungus control	A1 B1	C7		
105P029	Make recommendations for insect control	A1 B1	C7	B9	
105P030	Make recommendations for weed control	A1 B1	C7	B9	
105P031	Make recommendations for disease control	A1 B1	C7	B9	
Loading, Securing, Transporting and Unloading Agricultural Products					
105Q001	Prepare truck	B1			
105Q002	Load livestock	B1 C6	B3		
105Q003	Restrain livestock	B1			
105Q004	Transport livestock	B1			
105Q005	Monitor condition of livestock in transit	B1			
105Q006	Unload livestock	B1 C6	B3		
105Q007	Load grains, such as corn, wheat and soybeans	B1	C8		
105Q008	Unload grains	B1	C8		
105Q009	Load baled crops, such as alfalfa and straw	B1			
105Q010	Unload baled crops	B1			
105Q011	Load products, such as fertilizer and chemicals	B1			
105Q012	Load farm machinery	B1			
105Q013	Unload farm machinery	B1			
105Q014	Load livestock and other products	B1	D4		
105Q015	Load railroad cars with grain	B1			
105Q016	Secure loads and tag for shipping	B1	D4		
105Q017	Prepare shipping records	B1 B2	D4		
Applying Safety Practices					
105R001	Comply with shop and equipment safety rules	A1 B1 B8 C7	A3 B11 C8 C9 D5 E1 E4	B9	

Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
105R002 Apply basic emergency first aid techniques	B1	A3 B11 C9 D5		
105R003 Complete accident report	B1 B2	A3 B11 C9 D5		
105R004 Inspect work area and equipment for safe working environment	B1 B8	A3 B11 C9 D5 E1 E4		
105R005 Use fire extinguisher	B1	A3 B11 C9 D5		
105R006 Correct safety hazards	B1 C7	A3 B7 B11 C8 C9 D5		
105R007 Demonstrate cardiopulmonary resuscitation (CPR) techniques	B1	A3 B11 C9 D5		
105R008 Comply with safety requirements for working around automated systems	B1	A3 B11 C9 D5		
105R009 Participate in safety training program	A4 B1	A3 B11 C9 D2 D5		
Performing Examining Room and Laboratory Work				
105S001 Analyze fecal samples for worm eggs using the direct smear method	B1			
105S002 Analyze fecal samples for worm eggs using standard flotation method	B1			
105S003 Analyze fecal samples for worm eggs using centrifuge flotation method	B1			
105S004 Change soiled bandages	B1			
105S005 Collect urine sample using free catch method	B1			
105S006 Collect urine sample using catheterization method	B1			
105S007 Collect fecal samples	B1			
105S008 Collect semen	B1	B5		
105S009 Develop and fix x-ray film	B1			
105S010 Examine bacterial cultures	B1			
105S011 Perform blood chemistry test	B1			
105S012 Perform test for blood coagulability using estimation technique method	B1			
105S013 Perform test for blood coagulability using Lee and White method	B1			
105S014 Perform test for blood coagulability using one-stage prothrombin method	B1			
105S015 Perform test for blood coagulability using prothrombin consumption test method	B1			
105S016 Perform test for blood coagulability using partial thromboplastin time method	B1			
105S017 Perform test for blood coagulability using direct platelet count method	B1			
105S018 Perform test for blood coagulability using indirect platelet count method	B1			
105S019 Perform test for chemical composition of urine	B1			
105S020 Prepare bacterial cultures (solid agar)	B1			
105S021 Prepare blood to be sent to laboratory	B1			
105S022 Prepare examination room	B1			
105S023 Take and record pulse	B1			
105S024 Take and record temperature	B1			
105S025 Take blood samples for laboratory tests	B1			
105S026 Take x-rays in the clinic	B1			
105S027 Check blood for heartworms using microhematocrit method	B1			
105S028 Check blood for heartworms using modified Knotts method	B1			
105S029 Check blood for heartworms using differentiation	B1			

Occupational Task		Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
105S030	Perform a complete blood count (microhematocrit test)	B1			
105S031	Perform a white blood cell count using manual method	B1			
105S032	Perform a white blood cell count using kit method	B1			
105S033	Perform a red blood cell count using manual method	B1			
105S034	Perform a red blood cell count using kit method	B1			
105S035	Perform a differential blood cell count	B1			
105S036	Fill prescription containers	B1			
105S037	Mix chemicals for x-rav processor	B1			
105S038	Perform blood smear using cover glass method	B1			
105S039	Perform blood smear using slide method	B1			
105S040	Examine urine sediment	B1			
105S041	Perform skin scraping	B1			
105S042	Perform trypsin digestion test using tube test method	B1			
105S043	Perform trypsin digestion test using film test method	B1			
105S044	Perform vaginal smears	B1			
Assisting With First Aid and Surgery					
105T001	Administer intramuscular injections under supervision	B1			
105T002	Administer intravenous injections under supervision	B1			
105T003	Administer oral medications under s upervision	B1			
105T004	Administer oxygen under supervision	B1			
105T005	Administer rectal medications under supervision	B1			
105T006	Administer subcutaneous injections under supervision	B1			
105T007	Administer surface medications under supervision	B1			
105T008	Assist in anesthetizing animals	B1			
105T009	Assist in artificial respiration	B1			
105T010	Cleanse wounds	B1			
105T011	Clip and shave animalsí hair from operative areas	B1			
105T012	Position and drape animals for surgery	B1			
105T013	Hand surgical instruments to veterinarian	B1			
105T014	Inventory surgical instruments and materials before and after surgery	B1			
105T015	Lay out necessary equipment for surgery	B1			
105T016	Prepare animals for blood transfusions	B1			
105T017	Prepare chemicals for surgery	B1			
105T018	Prepare drugs for surgery	B1			
105T019	Prepare postoperative medications as prescribed	B1			
105T020	Prepare gown and drape pack	B1			
105T021	Prepare surgical glove packs	B1			
105T022	Start intravenous fluids	B1			
105T023	Stop external bleeding	B1			

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Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
105T024 Transport accident victim	B1			
105T025 Prepare anesthetic agent for injection	B1			
105T026 Assist in postmortem examination	B1			
105T027 Prepare standard instrument packs	B1			
Starting Up High-Temperature, Short-Time Pasteurization				
105U001 Inspect equipment prior to start-up	B1 C11	D1		
105U002 Adjust equipment for start-up	B1 C11	D1		
105U003 Prepare data recording equipment	B1 C11	D1		
105U004 Start up high-temperature, short-time pasteurization process	B1 C11	D1		
Processing High-Temperature, Short-Time Pasteurization				
105V001 Monitor pasteurization process	B1 C11	D1		
105V002 Adjust equipment for high-temperature, short-time processing	B1 C11	D1		
105V003 Record high-temperature, short-time processing data	B1 C11	D1		
105V004 Put product into storage tank	B1 C11	D1		
Performing Product-to-Product Changeover				
105W001 Prepare lines and valves to bring new product to balance tank	B1 C11	D1		
105W002 Adjust equipment for product changeover	B1 C11	D1		
105W003 Complete product changeover process	B1 C11	D1		
Performing Product Changeover Requiring Flush-Out				
105X001 Operate lines following established sequence	B1 C11	D1		
105X002 Set recording data equipment for changeover/flush-out	B1 C11	D1		
105X003 Perform flush-out procedures	B1 C11	D1		
105X004 Inspect equipment for proper operation	B1 C11	D1		
105X005 Complete product changeover process	B1 C11	D1		
Shutting Down High-Temperature, Short-Time Pasteurization				
105Y001 Prepare high-temperature, short-time for shut-down	B1 C11	D1		
105Y002 Shut down high-temperature, short-time system	B1 C11	D1		
105Y003 Inspect recording data equipment	B1 C11	D1		
Cleaning the High-Temperature, Short-Time Pasteurizer				
105Z001 Inspect and adjust equipment and lines for cleaning	B1 C11	D1		
105Z002 Perform cleaning procedures	B1 C11	D1		
105Z003 Inspect equipment	B1 C11	D1		

Horticulture Cluster Matrix

Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
Propagating Plants, Seeds and Cuttings				
160A001 Plan planting schedules	B1 B2 C1 C3		B2 B6	
160A002 Clean seed	B1			
160A003 Plant seed in flats or growing benches	B1 B2	C10	B6	
160A004 Plant seed using plate-type planter	B1 B2			
160A005 Plant seed using air-type planter	B1 B2			
160A006 Plant seed using precision small-seed-type planter	B1 B2			
160A007 Plant bulbs	B1 B2			
160A008 Transplant seedlings using hand transplanter	B1			
160A009 Transplant seedling fruit trees using hole digger	B1			
160A010 Transplant seedlings using wheel-type planter	B1			
160A011 Transplant using a hand transplanter	B1		B6	
160A012 Monitor plant growth	B1 B2		B2 B5	
160A013 Thin nursery stock	B1			
160A014 Lay sod	B1 B2		D2	
160A015 Maintain sod	B1 C1		D2	
160A016 Prepare plants and cuttings for propagation	B1	C10	B5	
160A017 Take cuttings	B1	C5 C10	B1 B5	
160A018 Stick cuttings	B1	C5	B1	
160A019 Label planted specimens	B1	C1	B3	
160A020 Plant trees and shrubs	B1		D3 D5	
160A021 Prepare seed for resting period	B1		B2	
160A022 Provide winterization of plants	B1			
160A023 Select seed varieties	B1 C3		B2 B6 D2	
160A024 Transplant cuttings	B1 B2	C5	B1 B5 D3	
160A025 Apply rooting hormone	B1 B2	C8 C10		
Preparing Soils and Planting Media				
160B001 Shred planting media	B1			
160B002 Screen planting media	B1		D5	
160B003 Mix media materials	B1 B2 C1	C10	B5 B11 B12 D5	
160B004 Pasteurize prepared media with steam	B1 B2	C10	B11	
160B005 Pasteurize media with chemicals	B1 B2		B11 D5	
160B006 Sterilize (pasteurize) soil in field	B1			
160B007 Mix fertilizer into media	B1 B2		B5 B10 B11 D5	
160B008 Construct open drainage ditch	B1		D4	
160B009 Prepare seedbed	B1 C1	C10	B5 B6 D2 D4	
160B010 Level or smooth planting area	B1		B5 B6 D2 D3 D4	
160B011 Mark off location of beds	B1 B2		B5 B6 D5	
160B012 Shape or form beds	B1			
160B013 Mark off planting spaces with bedwire	B1 B2			
Controlling the Plant Environment				
160C001 Control growth rate by applying retardant	B1 B2		B2	
160C002 Control light requirements by using shade cloth	B1		B2 B5	
160C003 Control temperature by setting thermostat	B1		B2 B5 D5	
160C004 Cultivate plants	B1 C5		B2 B5 D3 D5	

Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
160C005 Water plants and nursery stock	B1		B2 B5 D3 D5	
160C006 Apply mulches	B1		B5 B6 C2 D2 D3 D5	
160C007 Control pests	B1		B5 B6 D2 D5	
160C008 Treat diseased plants, bulbs and corms	B1 B2		B5 D5	
160C009 Remove diseased plants	B1		B5 D3 D5	
160C010 Plan conservation practices	B1 C10	C2	C2	
160C011 Set time clock for automatic mist propagation system	B1 B2		B5	
160C012 Aerate compacted soil	B1 C1		B5	
160C013 Pinch and disbud flowering plants	B1		B5 D5	
160C014 Force bulbs	B1 B2		B5 D5	
160C015 Report disease and spray damage	B1		D5	
160C016 Prune plants, hedges and shrubs	B1			
160C017 Thin nursery stock	B1		B5	
160C018 Force potted plants to bloom at seasonal times	B1		B5	
160C019 Attach care cards to plants	B1			
160C020 Condition flowers and plants	B1		B5	
160C021 Fill water pics	B1			
160C022 Sort seasonal flowers	B1			
160C023 Control soil erosion	B1 C10			
160C024 Wrap trees	B1			
160C025 Brace bareroot trees	B1			
160C026 Stake trees	B1			
160C027 Treat tree wounds	B1			
160C028 Treat tree cavities	B1			
Applying Fertilizer and Chemicals				
160D001 Calculate fertilizer and chemical applications	A4 B1 B2	C8	B5 B6 B7 B9 B10 D2 D3 D5	
160D002 Formulate fertilizer	A4 B1 B2		B5 B10	
160D003 Calibrate fertilizer application equipment	A4 B1 B2		B7 B10 D2	
160D004 Collect soil sample for fertility test	B1 C1		B5 B6 B10 D2 D5	
160D005 Test soil	B1 C1		B5 B10	
160D006 Make fertilizer and lime recommendations	B1		B5 B6 B7 B10	
160D007 Assess crop nutrient deficiencies	B1		B2 B10 D5	
160D008 Treat nutrient deficiencies	B1		B2 D3 D5	
160D009 Identify chemical injury of plants	B1		B5	
160D010 Calibrate chemical equipment	B1 B2			
160D011 Mix chemicals	B1 B2	C8	B5 B9 D5	
160D012 Time chemical applications	B1 B2 C5	C8	B5 B9 D3 D5	
160D013 Store chemicals	B1	C8	B9 D5	
160D014 Perform safety checks on equipment	B1		D5	
160D015 Transport chemicals	B1	C8	B9 D5	
160D016 Map chemical applications	B1 B2	C8	B9	
160D017 Compute fertilizer costs	B1 B2		B10 D5	
160D018 Apply fertilizer using watering system	B1 B2		B5 B10 D3 D5	
160D019 Apply fertilizer using auger-type distributor	B1 B2		D3	
160D020 Apply fertilizer using cyclone-type spreader	B1 B2		D2 D3	
160D021 Apply fertilizer using drill-type distributor	B1 B2			
160D022 Apply fertilizer using liquid applicator	B1 B2		D5	
160D023 Apply chemicals using boom-type sprayer	B1 B2		B9	
160D024 Apply chemicals using fumigant injector	B1 B2		B9	
160D025 Apply chemicals using air blast sprayer	B1 B2		B9	

Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
160D026 Select chemicals for specific problems	B1	C8	B9 D5	
160D027 Compute chemical costs	B1 B2		B9 D5	
160D028 Maintain chemical inventory file	B1 B2	C8	B9	
160D029 Determine insurance coverage needs	B1 B2	A4	A3	
160D030 Administer first aid	B1			
160D031 Dispose of chemicals and containers according to manufacturers specifications	B1		B9 D5	
160D032 Suggest lawn chemicals for pest control	B1		B9	
160D033 Interpret chemical labels	B1 B2		B9	
160D034 Suggest chemicals applied to gardens	B1		B9	
160D035 Compute chemicals needed for lawn/garden	B1 B2		B9	
160D036 Suggest chemicals for application to gardens	B1		B9	
Harvesting Plants				
160E001 Dig shrubs and trees	B1		D3	
160E002 Ball and burlap shrubs and trees	B1		D3	
160E003 Grade plants	B1		B5	
160E004 Label harvested plants by common names	B1		B3	
160E005 Harvest seeds	B1	C10		
160E006 Harvest bareroot stock	B1		D3	
160E007 Dig bulbs and corms	B1	C10	B5	
160E008 Clean and size harvested bulbs and corms	B1			
160E009 Dry harvested bulbs and corms	B1			
160E010 Cut flowers and ferns	B1			
160E011 Count, grade and bunch flowers and ferns	B1			
160E012 Prepare and place cut flowers in water or preservative	B1		E1	
160E013 Remove saleable plants from beds	B1		B5	
160E014 Remove bed wire from harvested areas	B1			
160E015 Mark trees to be harvested	B1 B2			
Harvesting Fruit and Vegetable Crops				
160F001 Pick small fruits	B1	D3	B7	
160F002 Pick tree fruits	B1	D3	B7	
160F003 Pick bush fruits	B1	D3	B7	
160F004 Pick bush vegetables	B1	D3		
160F005 Pick vine vegetables	B1	D3		
160F006 Deliver baskets or boxes to grader or market	B1	D3 D4		
160F007 Load pallets on truck or trailer	B1	D3 D4		
Grading and Packaging Fruit and Vegetable Crops				
160G001 Adjust a grader	B1	D1		
160G002 Wash and grade crops	B1	D1		
160G003 Cool crops using a cooler room	B1	D1	B8	
160G004 Set up grader	B1	D1		
Maintaining and Protecting Fruit Trees				
160H001 Maintain a mechanical topper	B1			
160H002 Prune trees for frame	B1			
160H003 Perform annual pruning for shape and fruit set	B1		B7	
160H004 Top fruit trees using mechanical topper	B1			

Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
Storing, Shipping and Taking Inventory				
160I001 Bundle plants	B1 B2			
160I002 Wrap plants	B1			
160I003 Pack plants	B1			
160I004 Bunch plants	B1 B2			
160I005 Pack shrubs	B1		D3	
160I006 Care for overwintering of container grown plants	B1		D3	
160I007 Check received merchandise against invoice listings	B1		A6 E1	
160I008 Keep current inventory of products for sale	B1		A6	
160I009 Load trucks and trailers for drop shipment	B1 B2	D4		
160I010 Transport products	B1	D4		
160I011 Package orders for shipment	B1	D4		
160I012 Store received supplies	B1	D4		
160I013 Write sales receipt	B1 B2			
160I014 Assemble shipping cartons	B1			
160I015 Load and unload agged and bulk materials	B1			
160I016 Store floral and foliage plants in cold storage units	B1		E1	
Designing/Installing Landscapes				
160J001 Obtain plants	B1		D5	
160J002 Follow landscape plan in installing plants	B1 B2		D5	
160J003 Plant trees	B1		D3 D5	
160J004 Plant shrubs	B1		D3 D5	
160J005 Plant ground covers	B1		D3 D5	
160J006 Seed lawns	B1 B2		D2	
160J007 Select plants	B1	C4 C10	D5	
160J008 Design corner planting/paper and pencil	B1 B2			
160J009 Design corner planting/landscape software	B1 B2			
160J010 Design line planting/paper and pencil	B1 B2			
160J011 Design line planting/landscape software	B1 B2			
160J012 Design foundation planting/paper and pencil	B1 B2			
160J013 Design foundation planting/landscape software	B1 B2			
160J014 Design landscape plan/paper and pencil	B1 B2	C10	B7	
160J015 Design landscape plan/landscape software	B1 B2			
160J016 Construct landscape model	B1 B2			
160J017 Price landscape design	B1 B2		D5	
160J018 Read landscape plan	B1 B2		D5	
160J019 Set landscaping stones	B1			
Maintaining and Improving Grounds				
160K001 Aerify turf	B1 C1	C2	D2	
160K002 Verticut turf	B1 C1	C2	D2	
160K003 Apply topdressing to turf	B1 B2		D2	
160K004 Overseed turf	B1		D2	
160K005 Mow grounds	B1	C2	D2	
160K006 Trim hedges	B1			
160K007 Trim lawn edges	B1		D2	
160K008 Irrigate lawns	B1		D2	
160K009 Prune trees	B1		D3 D5	
160K010 Prune plants, hedges and shrubs	B1		D3 D5	

Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
160K011 Sod worn spots in lawn	B1	C2	D2	
160K012 Clean ornamental pools	B1			
160K013 Clean grounds of litter and leaves	B1		C2	
160K014 Dispose of prunings	B1			
160K015 Maintain pools and fountains	B1			
160K016 Apply salt to icy sidewalks and drives	B1			
Servicing and Maintaining Equipment and Facilities				
160L001 Service tillage preparation equipment	B1 C2			
160L002 Service planting equipment	B1 C2			
160L003 Service cultivating equipment (clean, lubricate and adjust chain drive)	B1 C2			
160L004 Service harvesting equipment	B1 C2			
160L005 Service conveyance systems	B1 C2			
160L006 Service tires	B1			
160L007 Service utility tractor	B1			
160L008 Service business vehicle	B1 C2			
160L009 Service small four-cycle and two-cycle engines	B1	E4	C3	
160L010 Maintain hand tools	B1	E4	C4	D3
160L011 Service sprinkler system by replacing valves and gaskets	B1			
160L012 Clean dusters	B1	C8	B9	
160L013 Replace greenhouse fan	B1			
160L014 Clean sprayers	B1	C8	B9	
160L015 Install sprinkler heads, nozzles and other irrigation equipment	B1			
160L016 Clean work and delivery areas	B1		C4	
160L017 Service electrical outlets and extensions	B1			
160L018 Lubricate and adjust power equipment	B1	E4	C4	
160L019 Service ventilation system	B1			
160L020 Troubleshoot electrical wiring and equipment	B1			
160L021 Troubleshoot equipment failure	B1	E4	C4	
160L022 Calibrate equipment	B1 B2		C4	
160L023 Maintain service records	B1 B2		C4	
160L024 Order equipment parts	B1 B2	E4	C4	
160L025 Service electrical controls	B1			
160L026 Perform routine maintenance and repairs	B1	E4	C4	
160L027 Service electric motors	B1			
160L028 Prepare equipment for off-season storage	B1	E4	C4	
160L029 Establish service records	B1 B2		C4	
160L030 Clean and fumigate storage facility	B1	C8	B9	
160L031 Assemble mowers for display	B1	E4		
160L032 Assemble seeding equipment for display	B1			
160L033 Assemble sprayers for display	B1			
160L034 Assemble spreaders for display	B1			
160L035 Assemble snow blowers for display	B1	E4		
160L036 Demonstrate use of spreaders	B1			
160L037 Demonstrate use of mowers	B1	E4		
160L038 Demonstrate use of sprayers	B1			
160L039 Demonstrate use of seeding equipment	B1			
160L040 Demonstrate use of snow blowers	B1	E4		
160L041 Suggest cultural practices to control lawn and garden pests	B1		B9	

Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
160L042 Clean and sanitize cold storage facility	B1			
160L043 Fumigate cold storage facility	B1	C8	B9	
160L044 Assemble applicating pumps	B1			
160L045 Assemble boom-type chemical equipment	B1			
160L046 Change nozzles on applicators	B1			
160L047 Clean clogged screens	B1			
160L048 Paint applicating equipment	B1			
160L049 Replace hose clamps	B1			
160L050 Replace liquid hoses	B1			
Performing General Office Work				
160M001 Process incoming telephone calls	B1		A5	
160M002 Process outgoing telephone calls	B1		A5	
160M003 Clean work area	B1		A5	
160M004 File materials	B1		A5	
160M005 Type reports	B1		A5	
160M006 Process incoming mail	B1		A5	
160M007 Process outgoing mail	B1		A5	
160M008 Maintain mailing list	B1		A5	
160M009 Schedule appointments and meetings	B1 B2		A5	
160M010 Repair minor malfunctions of office equipment	B1		A5	
160M011 Duplicate materials	B1		A5	
160M012 Establish filing system	B1		A5	
160M013 Establish file index	B1		A5	
160M014 Prepare bank deposits	B1 B2			
160M015 Reconcile bank statements	B1 B2			
160M016 Write field reports	B1		A5	
160M017 Order supplies and equipment	B1		A6	
160M018 Establish a payroll system	B1 B2			
160M019 Prepare payroll	B1 B2			
Performing Sales Duties				
160N001 Conduct sale	B1 B2		A5	
160N002 Close sale	B1 B2		A5	
160N003 Plan territory management	B1		A1	
160N004 Complete business forms	B1 B2		A5	
160N005 Determine customer needs	B1		A1 A3 C4	
160N006 Conduct sales meetings	A4 B1		A1	
160N007 Identify potential buyers	B1		A1	
160N008 Provide customers with technical assistance	B1		B4 C4	
160N009 Recommend plant maintenance procedures	B1			
160N010 Prepare sales options	B1 B2			
160N011 Secure consumer approval for sales option	B1			
160N012 Implement approved sales option	B1			
160N013 Evaluate sales process	B1 B2		A1	
160N014 Plan marketing strategy	B1 B2		A1	
160N015 Develop promotional aids	B1			
160N016 Prepare plants for sale	B1			
160N017 Prepare floral arrangements	B1			
160N018 Process telephone orders	B1 B2			
160N019 Prepare invoices	B1 B2			
160N020 Assist customer in locating merchandise	B1			

Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
160N021 Inform customer of warranty or guarantee specifications	B1		A5 C4	
160N022 Compute sales tax	B1 B2		A5 C4	
160N023 Complete sales slip	B1 B2		A5 C4	
160N024 Inform customer of guarantee specifications	B1			
160N025 Identify plants	B1		B3	
160N026 Identify plant diseases	B1			
160N027 Identify common lawn and garden insects	B1		B6	
160N028 Identify garden crops	B1		B3 B6	
160N029 Suggest procedures for fungus control	A4 B1			
160N030 Suggest procedures for insect control	A4 B1			
160N031 Suggest procedures for weed control	A4 B1			
160N032 Suggest procedures for disease control	A4 B1			
Performing Sales-Related Duties				
160O001 Open store or department	B1		A5	
160O002 Process cash sales transaction	B1 B2			
160O003 Process debit card sales transaction	B1 B2		A5	
160O004 Process charge card sales transaction	B1 B2		A5	
160O005 Package customer purchase	B1		A5	
160O006 Process customer complaint	B1 B2		A5 C4	
160O007 Close out cash register	B1 B2		A5	
160O008 Close store or department	B1		A5	
160O009 Process customer returned sales	B1 B2		A5	
160O010 Greet and meet people	B1		A5	
160O011 Maintain customer file system	B1 B2			
160O012 Interpret market information	B1 B2			
160O013 Label and price products	B1 B2		A5	
160O014 Prepare advertisements	B1		A1	
160O015 Code and date merchandise	B1		A5	
160O016 Rotate horticulture and nursery products	B1			
160O017 Arrange delivery of merchandise	B1		A5	
160O018 Order supplies and stock	B1		A5 C4	
160O019 Process incoming order	B1 B2		A5	
160O020 Return unusable merchandise	B1		A5	
160O021 Update prices on merchandise	B1 B2		A5	
160O022 Stock merchandise displays	B1		A5	
160O023 Store merchandise in storage area	B1		A5	
160O024 Read lawn and pest management calendar	B1			
160O025 Design and letter show cards	B1			
160O026 Build counter and table-top displays	B1			
160O027 Stock shelves, gondolas and counter tops with merchandise	B1			
160O028 Prepare merchandise orders for wholesalers	B1 B2			
160O029 Gift wrap purchases	B1			
160O030 Wire flowers by telephone	B1			
Maintaining and Constructing Structures				
160P001 Service electrical systems of buildings	B1			
160P002 Paint exterior surfaces of buildings	B1 B2			
160P003 Paint interior surfaces	B1.			
160P004 Repair and glaze windows and greenhouse lights	B1			
160P005 Construct hot beds	B1 B2		C1	

Occupational Task	Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
160P006 Construct cold frames	B1 B2		C1 C2	
160P007 Perform maintenance inspection of facilities	B1		C1 C2	
160P008 Repair roofing and gutters	B1		C1	
160P009 Repair siding	B1		C1	
160P010 Repair doors and entry ways	B1		C1	
160P011 Maintain ventilation systems of buildings	B1		C2	
160P012 Replace plastic covering on greenhouse structures	B1		C1 C2	
160P013 Repair wooden portions of greenhouse superstructure	B1		C1 C2	
160P014 Replace damaged sections of structures and plastic coverings	B1		C1 C2	
160P015 Replace damaged support wires for black cloth and plastic coverings	B1		C2	
160P016 Repair wooden greenhouse benches	B1		C1	
160P017 Construct a packing shed	B1		C1	
160P018 Replace damaged support wires for saran and black cloth and plastic coverings	B1		C2	
160P019 Construct display shelves	B1		C1	
160P020 Arrange facilities for seasonal changes	B1			
Managing the Business				
160Q001 Maintain business records	B1 B2		A2 A3 A4 A6	
160Q002 Prepare financial statements	B1 B2		A2	
160Q003 Interpret financial statements	B1 B2		A2	
160Q004 Complete business loan application process	B1 B2		A2 A3	
160Q005 Develop credit plan	B1 B2		A2 A4	
160Q006 Prepare budget	B1 B2		A2 A3	
160Q007 Prepare tax statements	B1 B2			
160Q008 Prepare depreciation schedule	B1 B2		A2	
160Q009 Calculate net worth	B1 B2		A3	
160Q010 Develop land use program	B1 C10	C2		
160Q011 Supervise agriculture workers	B1 B6			
160Q012 Orient new employees	B1		A6	
160Q013 Plan work schedules	B1 B2	A5	A4 A5 A6	
160Q014 Determine labor needs	B1 B2	A5	A4 A6	
160Q015 Train workers using demonstration-performance method	B1			
160Q016 Evaluate employee performance	B1	A5	A6	
160Q017 Prepare reports	B1 B2	A5	A4	
160Q018 Develop business agreements	B1 B2	A5	A4	
160Q019 Develop marketing plan	B1 B2		A1	
160Q020 Maintain inventory records	B1 B2		A3 A5	
160Q021 Select computer software for records and reports	B1 B2	A2	A1 A2	
160Q022 Select computer software for horticulture applications	B1 B2			
160Q023 Use computerized network on agricultural marketing and management	B1 B2	A10	A1	
160Q024 Prepare periodic reports and financial stat ements using computer system	B1 B2	A2 A10	A2	
160Q025 Input accounting entries in computerized bookkeeping system	B1 B2	A10	A2	
160Q026 Establish computerized inventory control system	B1 B2	A10	A6	

Occupational Task		Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
160Q027	Analyze financial statements using financial ratios	B1 B2	A2	A2	
160Q028	Select bookkeeping/accounting system	B1 B2			
160Q029	Conduct periodic inspection of merchandise	B1		A5 A6	
160Q030	Conduct inventory of merchandise	B1 B2		A2 A5 A6	
Applying Safety Practices					
160R001	Apply basic emergency first aid techniques	B1			
160R002	Use fire extinguisher	B1			
160R003	Administer cardiopulmonary resuscitation (CPR)	B1			
160R004	Comply with safety requirements for working around automated equipment	B1 B8	E4		
160R005	Participate in safety training programs	B1			
160R006	Check working condition of respirator	B1			
160R007	Comply with laws regarding notices of chemical application	B1	C8	B9	
160R008	Obtain and renew chemical application license	B1			
160R009	Determine safe weather conditions for chemical application	B1	C8	B9	
160R010	Clean up chemical spills	B1			
160R011	Recognize pesticide poisoning symptoms	B1			
160R012	Inspect protective clothing before using	B1 B8			
Designing Arrangements					
160S001	Design artificial flower and foliage arrangements	B1	C10	E2 E5	
160S002	Design casket blankets	B1			
160S003	Design circle arrangements	B1		E3	
160S004	Design corsages	B1		E3	
160S005	Design dish gardens	B1			
160S006	Design dried arrangements	B1		E2 E5	
160S007	Design funeral baskets	B1			
160S008	Design funeral sprays	B1			
160S009	Design funeral vases	B1			
160S010	Design funeral wreaths	B1			
160S011	Design novelty arrangements	B1		E2 E3 E5	
160S012	Design oval arrangements	B1		E3	
160S013	Design planters	B1			
160S014	Design right angle shaped arrangements	B1		E5	
160S015	Design spiral shaped arrangements	B1			
160S016	Design symmetrically balanced triangle arrangements	B1		E3 E5	
160S017	Design terrariums	B1			
160S018	Design asymmetrically balanced triangle arrangements	B1		E3 E5	
160S019	Design vertically shaped arrangements	B1		E5	
160S020	Dress potted plants	B1			
160S021	Make bows	B1		E3	
160S022	Set up and dismantle wedding decorations	B1			
160S023	Prepare special occasion decorations	B1			
160S024	Spray tint both dried and live floral products	B1		E2 E5	
160S025	Wire flowers using piercing method	B1			
160S026	Wire flowers using hairpin method	B1			

Occupational Task		Central Core	Ag. Business & Mgt.	Horticulture	Ag. Resources
160S027	Wire flowers using hook-wire method	B1			
160S028	Make silk flowers	B1			
160S029	Cut florette for funeral baskets and filler	B1			
160S030	Make nets or fans	B1			
160S031	Make fruit baskets	B1			
160S033	Prepare designed ribbon using glue and glitter	B1			
160S034	Design bud vases	B1		E3	
160S035	Prepare sand painting or sculpture	B1			
160S036	Make silk flower and foliage arrangement	B1		E2 E5	
160S037	Make material for corsages	B1			

Agricultural Resources Cluster Matrix

Occupational Task	Central Core	Ag. Business & Mgt.	Ag. Resources
Managing the Recreational Facility			
190A001 Complete weekly receipts	B1 B2		B3 B4 D2 D7
190A002 Complete invoices	B1 B2		B3 B4 C4 D2 D7
190A003 Requisition materials, supplies and services	B1 B2		B3 B4 C2 C3 C4 C6 C7 C8 D1 D2 D7
190A004 Maintain inventory records	B1 B2		B3 B4 C4 C6 C8 D1 D2 D7
190A005 Maintain equipment maintenance records	B1 B2		B3 B4 C4 C8 D1 D2 D7
190A006 Follow work schedule	B1 B2		B3 B4 C2 C3 C4 C8 D1 D2 D7
190A007 Contribute to annual park management update	B1		A2 B3 B4 C4 D2 D5 D6 D7
190A008 Identify specific recreational program needs for visitors	B1		B3 D2 D6 D7
190A009 Complete business forms	B1 B2		B3 B4 C2 C4 C6 D2 D1 D7
190A010 Communicate orally with visitors	B1		B4 C4 D2 D6 D7
190A011 Assist in assessing and collecting fees and charges	B1 B2		B4 C4 D2 D7
190A012 Determine land-use capability	B1	C2	A1 A4 A5 B1 B3 B4 B5 C2 C7 C9 D2 D6 D7
190A013 Assist in development of resource conservation plans	B1	C2	A4 A5 B1 B2 B3 B4 B5 C7 C9 D1 D2 D6 D7
190A014 Interpret maps, charts and aerial photographs	B1 B2		A4 B3 C9 D1 D2 D7
Applying Laws, Regulations and Policies			
190B001 Interpret visitor disciplinary processes	B1	A3	B3 D7
190B002 Interpret game and wildlife laws	B1	A3 B9	B5 C1 C2 C5 C7 C8 D1 D2 D3 D7
190B003 Interpret stream, lake, pond and groundwater laws	B1	A3 C2	A4 B5 C3 D1 D2 D7
190B004 Patrol park areas	B1	A3	B3 D7
190B005 Request visitors to voluntarily comply with rules and regulations	B1	A3	B4 D5 D7
190B006 Process visitor complaints	B1	A3	B4 D7
190B007 Report violations to appropriate authority	B1	A3	A2 D5 D7
190B008 Interpret Environmental Protection Agency (EPA) regulations	A4 B1	A3	A1 A2 A5 B3 B4 C8 D2 D3 D5 D7
190B009 Maintain permits, certificates and licenses	B1	A3	C2 C4 C5 C6 D6 D7
190B010 Maintain crowd control	B1	A3	B4 D6 D7
190B011 Direct vehicular and pedestrian traffic	B1	A3	B4 D6 D7
190B012 Greet and meet people	B1	A3	B3 B4 D7
190B013 Prepare service work order	B1	A3	B4 C4 C8 D6 D7
190B014 Estimate cost of service work	B1 B2	A3	C8 D7
190B015 Post facility directions and warnings	B1	A3	B4 C4 D2 D7
190B016 Post facility rules and regulations	B1	A3	C4 D2 D7
190B017 Monitor camping and swimming areas	B1	A3	C7 D7
190B018 Maintain wildfire protection lanes	B1	A3	B3 D7
190B019 Maintain facility sanitation	B1	A3	C4 D7
Performing Promotional Activities			
190C001 Conduct a visitorsi program and tour	B1		B3 B4 D2 D7
190C002 Register visitors	B1		B3 B4 D2 D7
190C003 Give information and directions in a variety of formal and informal settings	B1		B3 B4 C4 C7 D2 D6 D7
190C004 Implement environmental education programs	A4 B1		B3 D1 D2 D7

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Occupational Task	Central Core	Ag. Business & Mgt.	Ag. Resources
190C005 Identify recreational needs and interests of special individuals and groups	B1		D1 D2 D7
190C006 Lead or guide recreational activities	B1		B4 D2 D6 D7
190C007 Stimulate interest and participation in recreational activities for special groups	B1		B4 D2 D6 D7
Managing Facility Flora and Fauna			
190D001 Identify plant communities and dominant species within a selected area	B1 C10		B1 B2 B3 B5 C2 C3 C6 C9 D1 D6 D7
190D002 Identify native plant species within a selected area	B1		B1 B2 B3 B5 C9 D1 D7
190D003 Apply pesticides	B1 B2		C3 C7 D1 D7
190D004 Identify wildlife species within a selected area	B1 C10	B9	C1 C2 C3 C5 C6 C7 C8 C9 D1 D3 D7
190D005 Identify endangered or exotic species of plantand animal life in a selected area	B1	B9	C1 C5 C7 C9 D1 D3 D7
190D006 Monitor an ecological burn	B1		D1 D7
Performing General Office Work			
190E001 File materials, such as receipts, letters, documents, specifications and orders	B1 B2		B4 C2 C3 C4
190E002 Type reports	B1 B2		
190E003 Process incoming telephone calls	B1		B4 C4
190E004 Process outgoing telephone calls	B1		B4 C4
190E005 Clean work areas	B1		B4
190E006 Make minor office equipment repairs	B1		B4
Using Tools, Materials and Equipment			
190F001 Transport upplies using motorized wheeled or tracked equipment	B1		C6 C7
190F002 Maintain grounds using power tools	B1		B4 C7
190F003 Maintain grounds using power equipment	B1		B4 C2 C7 D1
190F004 Use hand tools	B1		B4 C2 C6 C7 C9 D1
190F005 Patrol lake using motorized and nonmotorized watercraft	B1		
190F006 Perform preventative maintenance on tools	B1		C2 C6 C9 D1
190F007 Perform preventative maintenance on equipment	B1		A2 C2 C3 C6 D1
190F008 Pick up supplies using business vehicles	B1		
190F009 Maintain a tool and equipment inventory	B1 B2		
Assembling, Servicing and Maintaining Equipment and Facilities			
190G001 Follow a facility and grounds maintenance schedule	B1		A4 B2 B5 C2 C3 C6 C7 C9 D1 D6
190G002 Report facility and grounds maintenance needs	B1		A4 B5 C2 C3 C7 C9 D1 D6
190G003 Inspect water and sewer systems	B1		A1 A5 C2
190G004 Inspect structures and conveniences needing maintenance	B1		B4 C2 C7 C9 D1
190G005 Maintain grounds and recreation areas	B1		A1 A4 A5 B4 C1 C7 D1 D6
190G006 Construct recreational equipment	B1 B2		B2
190G007 Make electrical repairs	B1		C2 C3
190G008 Troubleshoot equipment failure	B1		C2 C3
190G009 Prepare concrete forms	B1 B2		
190G010 Finish concrete	B1		
190G011 Maintain facility roads	B1		

Occupational Task	Central Core	Ag. Business & Mgt.	Ag. Resources
1906012 Maintain facility culverts	B1		C7
1906013 Maintain facility drainage ditches	B1		A1 C2 C7
1906014 Perform preventative and scheduled maintenance activities on grounds and facilities	B1 B2 C2	C2	B2 C7
Applying Safety Practices			
1901H001 Apply basic emergency first aid	B1		
1901H002 Use fire extinguisher	B1		B3
1901H003 Administer cardiopulmonary resuscitation (CPR)	B1		
1901H004 Comply with safety requirements for working around automated equipment	B1		D2 D5
1901H005 Participate in safety training programs	B1		D2 D3
1901H006 Assist with search and rescue operations	B1	A3	
1901H007 Implement plans to protect visitors from dangerous animals and other hazards	B1	A3	B9 C7 D2
1901H008 Implement plans to protect animals and plants and other resources from visitors	B1	A3 B9	C7 B3 B5 D2
1901H009 Store flammable and other hazardous materials safely	B1	A3	C2 C3 D3
1901H010 Monitor equipment for safe operation	B1	A3	B4 C2 C4 D2 D3
1901H011 Maintain shields, guards and other safety devices on tools and equipment	B1	A3	C4 D2
1901H012 Comply with Occupational Safety and Health Administration (OSHA) safety standards	A1 B1	A3	
1901H013 Complete accident or injury reports	B1	A3	D2

A P P E N D I X D

Developing Agriculture Course Outlines from Core Units and Problem Areas

Agricultural Business and Management Cluster

Major changes are being made in the scope and structure of agricultural education programs in Illinois high schools. These changes include a reduction in agricultural production content and an increase in agribusiness content, task oriented instruction, and science applications. The problem areas developed through the Illinois Core Curriculum Revision Project were written to help teachers make these changes in their instructional programs. However, the core problem areas are not intended to be used as a total or complete program of instruction. Broad differences in needs of students enrolled in local/regional instructional programs and local/regional objectives of these programs suggest that a portion of each agriculture course should be locally/regionally planned to address local/regional, unique needs. A suggested proportion of 60% core problem areas and 40% locally/regionally planned problem areas should provide teachers with the freedom needed to offer instruction which meets local/regional needs and also addresses the recommended changes of state and national groups.

Most of the core problem areas include tasks from the Illinois Task List, State Goals for Learning, employability skills, and appropriate academic content. However, additional content in each of these areas need to be added as the local/regional teacher develops the 40% portion of the local/regional program.

Course sheets for sample courses in the Agricultural Business and Management Cluster have been prepared. The course titles are taken from the suggested articulated program sequence described in the Handbook for Secondary Vocational Program Planning (DAVTE).

The course sheets show the core problem areas which might be included in each of the four courses in the Agricultural Business and Management Cluster. All of the core problem areas included in the Central Core and the Agricultural Business and Management Clusters have been assigned to the four courses. However, these listings are not intended to be used as course outlines. Rather they represent content which might be used as the 60% portion of the program. In some situations, teachers may elect to delete or scale-down the core problem areas in favor of other content deemed to be more appropriate and significant. Such modifications and refinements are encouraged as sound planning procedures.

Sample Course Content for Introduction to the Agricultural Industry

Agricultural Literacy

1. Identifying Careers in Agriculture/Horticulture
2. Identifying and Using Agricultural Organizations, Agencies, and Sources of Information

Generalizable Skills in Agricultural Occupations

1. Developing Communications Skills in Agriculture
2. Applying Mathematics Skills in Agriculture
3. Developing Problem Solving Skills in Agriculture

Basic Principles of Agricultural Science

1. Understanding Basic Soil Science Principles
2. Identifying and Using Agricultural Tools and Equipment
3. Identifying Basic Principles of Plant Science
4. Identifying Basic Principles of Animal Science
5. Understanding Food Science Technology

Developing Leadership Capabilities in Agriculture/Agribusiness

1. Understanding the History and Organization of FFA
2. Recognizing Opportunities in FFA

Supervised Experience in Agriculture/Horticulture

1. Understanding the Structure and Purposes of SAE
2. Planning and Developing SAE Programs

Plant and Soil Science

1. Classifying Soils
2. Classifying Plants
3. Propagating Plants
4. Understanding Plant Germination, Growth, and Development

Agricultural Engineering/Mechanization

1. Welding and Metalworking

Sample Course Content for Agricultural Science

Agricultural Literacy

1. Understanding the Relationship Between Agriculture and the Environment
2. Understanding the World Food and Fiber Chain
3. Recognizing the Role of Research and Development in Agriculture

Generalizable Skills in Agricultural Occupations

1. Developing Human Relations Skills in Agriculture
2. Developing Safe Work Habits in Agricultural Occupations

Basic Principles of Agricultural Science

1. Using Energy Effectively
2. Identifying Basic Principles of Electricity
3. Identifying Basic Agricultural Mechanics Principles

Basic Agribusiness Principles and Skills

1. Developing Basic Microcomputer Skills
2. Managing Personal Finances

Developing Leadership Capabilities in Agriculture/Agribusiness

1. Developing Leadership Skills Through Youth Organizations
2. Participating in Community and Government Leadership

Supervised Experience in Agriculture/Horticulture

1. Expanding My SAE

Animal Science

1. Understanding the Animal Production Industry
2. Classifying Animals
3. Understanding Animal Anatomy and Physiology
4. Meeting Nutritional Needs of Animals
5. Understanding Animal Breeding and Reproduction
6. Caring for Animals

Plant and Soil Science

1. Enhancing Soil Fertility
2. Preventing Soil Erosion and Managing Land

Agricultural Engineering/Mechanization

1. Understanding and Maintaining Small Engines

Sample Course Content for Agribusiness Operations

Agricultural Literacy

1. Recognizing the Role of Agriculture in Society

Generalizable Skills in Agricultural Occupations

1. Gaining Employment in an Agricultural Occupation

Basic Principles of Agricultural Science

1. Understanding and Using Pesticides
2. Understanding Food Science Technology

Agribusiness Operation and Management

1. Marketing Agricultural Products and Services
2. Planning an Organizing the Agribusiness
3. Operating the Agribusiness
4. Identifying Career Opportunities in Agribusiness Management

Animal Science

1. Maintaining Animal Health
2. Meeting the Environmental Requirements of Animals
3. Identifying Career Opportunities in Animal Science

Plant and Soil Science

1. Controlling Plant Pests
2. Maintaining Grain Quality
3. Identifying Career Opportunities in Plant and Soil Sciences
4. Identifying Alternative Crop Production Systems

Food Science and Technology

1. Meeting Nutritional Needs of Food Consumers
2. Identifying Career Opportunities in Food Science

Agricultural Engineering/Mechanization

1. Designing, Building, and Maintaining Agricultural Structures
2. Repairing and Maintaining Agricultural Equipment
3. Identifying Career Opportunities in Agricultural Engineering/Mechanization

Sample Course Content for Agribusiness Management

Agricultural Literacy

1. Recognizing the Impact of Technology on Agriculture: Biotechnology
2. Recognizing the Impact of Technology on Agriculture: Electronics

Generalizable Skills in Agricultural Occupations

1. Developing Transition Skills in Agriculture
2. Identifying and Practicing Ethics in Agricultural Occupations

Basic Principles of Agricultural Science

1. Conserving Agricultural Resources

Basic Agribusiness Principles and Skills

1. Keeping and Using Records in Agricultural Occupations
2. Applying Basic Economic Principles in Agribusiness
3. Understanding Basic Business Organization

Agribusiness Operation and Management

1. Financing the Agribusiness
2. Understanding Agricultural Law Applications
3. Insuring the Agribusiness
4. Advertising and Selling Agricultural Products and Services
5. Managing Entrepreneurship Opportunities in Agriculture
6. Using Microcomputers in Agribusiness Management

Animal Science

1. Identifying Alternative Animal Production Systems: Aquaculture

2. Conserving Wildlife Resources
3. Understanding Economic Principles of Livestock Production

Food Science Technology

1. Processing Agricultural Products
2. Adhering to Government Regulations
3. Packaging and Distributing Food Products

Agricultural Engineering/Mechanization

1. Financing and Managing Agricultural Equipment
2. Manufacturing, Distributing, Selling, and Servicing Agricultural Equipment

Horticulture Cluster

The Horticulture Cluster is one of four clusters identified in the Handbook for Secondary Vocational Program Planning (DAVTE). It is also one of the areas for which core problem areas were prepared in the Illinois Agricultural Core Curriculum Revision Project. To assist teachers in the task of integrating these problem areas into their instructional programs, four sample course sheets have been prepared. The course sheets incorporate all of the problem areas in the Central Core and the Horticulture Cluster of the Core into the following suggested courses:

1. Introduction to the Agricultural Industry
2. Horticultural Science
3. Horticultural Production and Floral Design
4. Landscaping and Turf Management

The lists of problem areas on the course sheets are not intended as recommended course outlines. Rather, they represent a possible first step in the development of course outlines for a horticultural program. Teachers will need to add other problem areas to make up as much as 40% of the final course outline. Considerations such as local/regional needs, student needs, and instructional resources available to the teacher will affect the nature and scope of additions and modifications to be made in the course outlines.

Instructional programs in horticulture at the high school level may be conducted to achieve a variety of educational objectives. Some of these objectives include the development of entry-level, employment skills, instruction for avocational or leisure purposes, instruction to supplement and reinforce science instruction, and as part of the general education offering of the school. The objective(s) established by the local school or regional system will suggest which core problem areas to include in the course outlines and where instructional emphases are to be made.

Sample Course Content for Introduction to the Agricultural Industry

Agricultural Literacy

1. Identifying Careers in Agriculture/Horticulture
2. Identifying and Using Agricultural Organizations, Agencies, and Sources of Information

Generalizable Skills in Agricultural Occupations

1. Developing Communications Skills in Agriculture
2. Applying Mathematics Skills in Agriculture
3. Developing Problem Solving Skills in Agriculture

Basic Principles of Agricultural Science

1. Understanding Basic Soil Science Principles
2. Identifying and Using Agricultural Tools and Equipment
3. Identifying Basic Principles of Plant Science
4. Identifying Basic Principles of Animal Science
5. Understanding Food Science Technology

Developing Leadership Capabilities in Agriculture/Agribusiness

1. Understanding the History and Organization of FFA
2. Recognizing Opportunities in FFA

Supervised Experience in Agriculture/Horticulture

1. Understanding the Structure and Purposes of SAE
2. Planning and Developing SAE Programs

Plant and Soil Science

1. Classifying Soils
2. Classifying Plants
3. Propagating Plants
4. Understanding Plant Germination, Growth, and Development

Agricultural Engineering/Mechanization

1. Welding and Metalworking

Sample Course Content for Horticultural Science

Agricultural Literacy

1. Recognizing the Role of Agriculture in Society
2. Understanding the Relationship Between Agriculture and the Environment
3. Recognizing the Impact of Technology on Agriculture: Biotechnology
4. Recognizing the Impact of Technology on Agriculture: Electronics

Basic Principles of Agricultural Science

1. Understanding Basic Genetics and Reproduction
2. Using Energy Effectively
3. Identifying Basic Principles of Electricity
4. Identifying Basic Agricultural Mechanics Principles
5. Conserving Agricultural Resources

Horticultural Science and Production

1. Propagating Plants
2. Understanding Plant Germination, Growth, and Development
3. Classifying Horticulture Plants
4. Growing Ornamental Plants

5. Developing Growing Media
6. Growing Plants Hydroponically

Horticultural Mechanics

1. Repairing, Maintaining, and Operating Small Engines
2. Repairing, Maintaining, and Operating Horticultural Equipment

Sample Course Content for Horticultural Production and Floral Design

Agricultural Literacy

1. Understanding the World Food and Fiber Chain
2. Recognizing the Role of Research and Development in Agriculture

Generalizable Skills in Agricultural Occupations

1. Developing Human Relations Skills in Agriculture
2. Developing Sale Work Habits in Agricultural Occupations

Developing Leadership Capabilities in Agriculture/ Agribusiness

1. Developing Leadership Skills Through Youth Organizations
2. Participating in Community and Government Leadership

Supervised Experience in Agriculture/Horticulture

1. Expanding My SAE

Horticultural Science and Production

1. Understanding Plant Anatomy and Physiology
2. Growing Vegetables
3. Growing Fruits
4. Processing Fruits and Vegetables
5. Controlling Plant Pests
6. Enhancing Soil Fertility

Horticultural Mechanics

1. Designing, building, and Maintaining Horticultural Structures
2. Utilizing Energy Alternatives

Floral Design

1. Handling and Preparing Cut Flowers
2. Designing Silk and Dried Arrangements
3. Designing Live Arrangements
4. Utilizing Wire Services
5. Identifying the Principles in Floral Design

Sample Course Content for Landscaping and Turf Management

Generalizable Skills in Agricultural Occupations

1. Developing Transition Skills in Agriculture
2. Identifying and Practicing Ethics in Agricultural Occupations
3. Gaining Employment in an Agricultural Occupation

Basic Agribusiness Principles and Skills

1. Keeping and Using Records in Agricultural Occupations
2. Applying Basic Economic Principles in Agribusiness
3. Developing Basic Microcomputer Skills
4. Understanding Basic Business Organization
5. Managing Personal Finances

Horticultural Business Operation and Management

1. Marketing Horticultural Products and Services
2. Financing the Horticultural Business
3. Insuring the Horticultural Business
4. Planning and Organizing the Horticultural Business
5. Advertising and Selling Horticultural Products
6. Operating the Horticultural Business

Landscaping

1. Designing and Drawing Landscape Plans
2. Establishing and Maintaining Turf Areas
3. Transplanting an Maintaining Landscape Plants
4. Surveying, Grading, and Tiling
5. Interior Plantscaping

Agricultural Resources Cluster

The Agricultural Resources Cluster is one of four clusters identified in the Handbook for Secondary Vocational Program Planning (DAVTE). It is also one of the areas for which core problem areas were prepared in the Illinois Agricultural Core Curriculum Revision Project. To assist teachers in the task of integrating these problem areas into their instructional programs, four sample course sheets have been prepared. The course sheets incorporate all of the problem areas in the Central Core and the Agricultural Resources Cluster of the Core into the following suggested courses:

1. Introduction to the Agricultural Industry
2. Agricultural Science
3. Resource Utilization and Conservation
4. Agricultural Resources Management

The lists of problem areas on the course sheets are not intended as recommended course outlines. Rather, they represent a possible first step in the development of course outlines for an agricultural resources program. Teachers will need to add other problem areas to make up as much as 40% of the final course outline. Considerations such as local/ regional needs, student needs, and instructional resources available to the teacher will affect the nature and scope of additions and modifications to be made in the course outlines.

Instructional programs in agricultural resources at the high school level may be conducted to achieve a variety of educational objectives. Some of these objectives include the development of entry-level, employment skills, instruction for avocational or leisure purposes, instructions to supplement and

reinforce science instruction, and as part of the general education offering of the school. The objective(s) established by the local school or regional system will suggest which core problem areas to include in the course outlines and where instructional emphases are to be made.

Sample Course Content for Introduction to the Agricultural Industry

Agricultural Literacy

1. Identifying Careers in Agriculture/Horticulture
2. Identifying and Using Agricultural Organizations, Agencies, and Sources of Information

Generalizable Skills in Agricultural Occupations

1. Developing Communications Skills in Agriculture
2. Applying Mathematics Skills in Agriculture
3. Developing Problem Solving Skills in Agriculture

Basic Principles of Agricultural Science

1. Understanding Basic Soil Science Principles
2. Identifying and Using Agricultural Tools and Equipment
3. Identifying Basic Principles of Plant Science
4. Identifying Basic Principles of Animal Science

Developing Leadership Capabilities in Agriculture/ Agribusiness

1. Understanding the History and Organization of FFA
2. Recognizing Opportunities in FFA

Supervised Experience in Agriculture/Horticulture

1. Understanding the Structure and Purposes of SAE
2. Planning and Developing SAE Programs

Plant and Soil Science

1. Classifying Soils
2. Classifying Plants
3. Propagating Plants
4. Understanding Plant Germination, Growth, and Development

Agricultural Engineering/Mechanization

1. Welding and Metalworking

Sample Course Content for Agricultural Science

Generalizable Skills in Agricultural Occupations

1. Developing Human Relations Skills in Agriculture
2. Developing Safe Work Habits in Agricultural Occupations

Basic Principles of Agricultural Science

1. Using Energy Effectively
2. Identifying Basic Principles of Electricity
3. Identifying Basic Agricultural Mechanics Principles

Basic Agribusiness Principles and Skills

1. Developing Basic Microcomputer Skills
2. Managing Personal Finances

Developing Leadership Capabilities in Agriculture/ Agribusiness

1. Developing Leadership Skills through Youth Organizations
2. Participating in Community and Government Leadership

Supervised Experience in Agriculture/Horticulture

1. Expanding my SAE

Animal Science

1. Classifying Animals
2. Understanding Animal Anatomy and Physiology
3. Meeting Nutritional Needs of Animals
4. Understanding Animal Breeding and Reproduction
5. Caring for Animals

Plant and Soil Science

1. Enhancing Soil Fertility
2. Preventing Soil Erosion and Managing Land

Agricultural Engineering/Mechanization

1. Understanding and Maintaining Small Engines

Sample Course Content for Resource Utilization and Conservation

Agricultural Literacy

1. Recognizing the Role of Agriculture in Society
2. Understanding the Relationship Between Agriculture and the Environment
3. Understanding the World Food and Fiber Chain

Basic Principles of Agricultural Science

1. Conserving Agricultural Resources
2. Understanding Food Science Technology

Basic Agribusiness Principles and Skills

1. Keeping and Using Records in Agricultural Occupations
2. Developing Basic Microcomputer Skills
3. Managing Personal Finances

Environmental Protection

1. Conserving Water Resources
2. Conserving Soil

Forestry

1. Classifying Trees
2. Identifying Trees and Forestry Products
3. Producing Christmas Trees

Fish and Wildlife Management

1. Classifying Fish
2. Stocking Fish Ponds
3. Feeding Fish
4. Classifying Game Birds and Animals
5. Feeding Game Birds and Animals
6. Raising Game Birds and Animals

Outdoor Recreation

1. Practicing Hunting Safety
2. Adhering to Laws and Regulations

Sample Course Content for Agricultural Resources Management

Agricultural Literacy

1. Recognizing the Role of Research and Development in Agriculture.
2. Recognizing the Impact of Technology on Agriculture: Biotechnology
3. Recognizing the Impact of Technology on Agriculture: Electronics

Generalizable Skills in Agricultural Occupations

1. Developing Transition Skills in Agriculture
2. Identifying and Practicing Ethics in Agricultural Occupations
3. Gaining Employment in an Agricultural Occupation

Basic Principles of Agricultural Science

1. Understanding Basic Genetics and Reproduction
2. Understanding and Using Pesticides

Basic Agribusiness Principles and Skills

1. Applying Basic Economic Principles in Agribusiness
2. Understanding Basic Business Organization

Environmental Protection

1. Controlling Air Pollution
2. Understanding Government Regulations and Controls
3. Managing Freshwater Resources

Forestry

1. Managing Forestry Resources
2. Processing Forest Products

Fish and Wildlife Management

1. Managing Fish Ponds
2. Controlling Wildlife Pests
3. Maintaining a Wildlife Habitat

Outdoor Recreation

1. Managing Game Preserves
2. Managing Hunting and Fishing Clubs
3. Identifying Outdoor Recreational Enterprises
4. Managing Golf Courses
5. Managing Parks and Recreational Areas

Agricultural Literacy Program

Agricultural education is broader than vocational agriculture. Education about agriculture or agricultural literacy should be an important part of a comprehensive agricultural education program at the elementary, secondary, and postsecondary school levels.

At the K–6 level, agricultural literacy instruction can be offered by integrating agricultural content into existing courses. Separate courses in agricultural literacy are not recommended at this level.

At the postsecondary school level, courses in agricultural literacy can be offered which are designed for special groups of students and related to one or more disciplines in the curriculum. Thus, agricultural literacy instruction is considered part of the general education offerings for college, university, and adult students.

Students enrolled in grades 7–12 should have the opportunity to learn about the food and fiber system and its economic, social and environmental significance, how to care for outdoor environments, and other agricultural topics. Such instruction is designed primarily for those students who are not involved in or pursuing careers in agriculture.

Agricultural literacy objectives can be achieved in two ways. Materials can be made available to all teachers so that agricultural literacy content can be integrated into existing courses. This approach would result in exposure to most or all students in the school. Another approach would be to engage the agriculture teacher in the instruction of one or more elective courses in agricultural literacy. Schools which follow the latter approach can utilize the agricultural core problem areas to develop course outlines.

Four examples of possible courses are included here as potential agricultural literacy offerings. The first three course sheets divide instruction into the following areas:

1. Environmental Literacy in Agriculture
2. Economic Literacy in Agriculture
3. Technological Literacy in Agriculture

For each of these courses, problem areas from the Core Curriculum are listed as possible and partial content.

The fourth course sheet is entitled "Agriculture in Our Lives." The units suggested for this course were taken from the agricultural literacy section of the report of the Committee on Agricultural Education in the Public Schools (see chapter 2). For each of the five units listed, core problem areas related to each unit are listed as possible instructional material for the course.

The four course sheets are not intended to be used as complete or recommended course outlines for an agricultural literacy program. They are presented here to illustrate how some of the agricultural core problem areas can be used to build an instructional program in the agricultural literacy area.

Sample Course Content for Environmental Literacy in Agriculture

Basic Agricultural Literacy

1. Recognizing the Role of Agriculture in Society
2. Understanding the Relationship Between Agriculture and the Environment
3. Understanding the World Food and Fiber Chain

Basic Principles of Agricultural Science

1. Understanding and Using Pesticides
2. Conserving Agricultural Resources

Environmental Protection

1. Conserving Water Resources
2. Controlling Air Pollution
3. Understanding Government Regulations and Controls
4. Conserving Soil
5. Managing Fresh Water Resources

Forestry

1. Identifying Trees and Forestry Products
2. Managing Forestry Resources

Fish and Wildlife Management

1. Classifying Fish
2. Classifying Game Birds and Animals
3. Maintaining Wildlife Habitat

Sample Course Content for Economic Literacy in Agriculture

Basic Agricultural Literacy

1. Recognizing the Role of Agriculture in Society
2. Identifying and Using Agricultural Organizations, Agencies, and Sources of Information about Agriculture

Basic Principles of Agricultural Science

1. Understanding Basic Soil Science Principles
2. Identifying Basic Principles of Plant Science
3. Identifying Basic Principles of Animal Science

Agribusiness Operation and Management

1. Marketing Agricultural Products and Services
2. Understanding Agricultural Law Applications
3. Advertising and Selling Agricultural Products and Services
4. Using Microcomputers in Agribusiness Management

Animal Science

1. Understanding the Animal Production Industry
2. Understanding Economic Principles of Livestock Production

Food Science and Technology

1. Meeting the Nutritional Needs of Food Consumers
2. Packaging and Distributing Food Products

Horticultural Business Operation and Management

1. Marketing Horticultural Products and Services
2. Advertising and Selling Horticultural Products

Sample Course Content for Technological Literacy in Agriculture

Basic Agricultural Literacy

1. Recognizing the Role of Research and Development in Agriculture
2. Recognizing the Impact of Technology on Agriculture: Biotechnology
3. Recognizing the Impact of Technology on Agriculture: Electronics

Basic Principles of Agricultural Science

1. Identifying Basic Agricultural Mechanics Principles
2. Identifying Basic Principles of Electricity
3. Understanding Food Science Technology
4. Using Energy Effectively

Agricultural Engineering/Mechanization

1. Designing, Building and Maintaining Agricultural Structures
2. Manufacturing, Distributing, Selling, and Servicing Agricultural Equipment

Horticultural Mechanics

1. Designing, Building and Maintaining Horticultural Structures
2. Utilizing Energy Alternatives

Sample Course Content for Agriculture in Our Lives

I. Food and Fiber System

A. Recognizing the Role of Agriculture in Society
B. Understanding the World Food and Fiber Chain
C. Identifying and Using Agricultural Organizations, Agencies, and Sources of Information About Agriculture.
D. Recognizing the Role of Research and Development in Agriculture
E. Recognizing the Impact of Technology on Agriculture: Biotechnology
F. Recognizing the Impact of Technology on Agriculture: Electronics

II. Food and Fiber Production

A. Understanding Basic Soil Science Principles
B. Identifying Basic Principles of Plant Science
C. Identifying Basic Principles of Animal Science
D. Understanding the Animal Production Industry
E. Understanding the Economic Principles of Livestock Production

III. Food and Fiber Processing

A. Meeting the Nutritional Needs of Consumers

B. Packaging and Distributing Food Products

C. Processing Agricultural Products

D. Adhering to Government Regulations

IV. Marketing Food and Fiber Products

A. Marketing Agricultural Products and Services

B. Marketing Horticultural Products and Services

C. Understanding Agricultural Law Applications

D. Advertising and Selling Agricultural Products an Services

E. Advertising and Selling Horticultural Products and Services

V. Care of Outdoor Environments

A. Understanding the Relationship Between Agriculture and the Environment

B. Understanding and Using Pesticides

C. Conserving Agricultural Resources

D. Controlling Air Pollution

E. Conserving Soil

F. Managing Fresh Water Resources

G. Identifying Trees and Forestry Products

H. Managing Forestry Resources

I. Maintaining Wildlife Habitat

Teaching Science Through Agriculture

There are many opportunities to teach science through agriculture. Biology, chemistry, general science, physics, and geology are important science areas which have many applications in agriculture. Student interest in science can often be generated or increased by relating science principles to examples in the real world. Science teachers can incorporate agriculture into their courses, and agriculture teachers can include more science in their courses.

Three possible courses in Agricultural Science which incorporate core problem areas into the outlines are included here as examples. The course titles of these examples are as follows:

1. Introduction to Agricultural Science
2. Advanced Agricultural Science
3. Applied Biological Science

The first outline, Introduction to Agricultural Science, includes 16 core problem areas which include important science content. Plant and soil science is the main theme of this course. The second outline, Advanced Agricultural Science, includes 15 core problem areas with important science content in animal science, food science, genetics, and other areas. Both of these courses are intended to serve as agricultural courses with a strong science basis. The third course, Applied Biological Science, is intended to serve as a science course with an agricultural basis. It represents a somewhat different approach to combining science and agriculture in the instructional program.

Biology, which emphasizes plant and animal science, is an obvious place to begin the correlation of instruction in agriculture and science. The Committee on Agricultural Education in Secondary Schools was established by the National Research Council to study agricultural education in the public schools. To illustrate how the study of biology and agriculture could be related, the Committee reviewed a widely used biology textbook (Otts and Towle, 1985) to identify units which are suited to the teaching of science through agriculture. Units identified were applied genetics, bacteria, multicellular plants, invertebrates and vertebrates, and ecological relationships.

A review of the agriculture core problem areas developed through the Illinois Core Curriculum Revision Project reveals several problem areas which could provide valuable learning experiences in the five biology units. A listing has been prepared to show which core problem areas are related to the biology units. Teachers should not assume that all of the biology content that should be taught is included in the agriculture core problem areas. Additional science content and agriculture content would have to be added to structure a course which could be counted as science credit or meet graduation requirements.

Sample Course Content for Introduction to Agricultural Science

Agricultural Literacy

1. Identifying Careers in Agriculture/Horticulture
2. Understanding the Relationship Between Agriculture and the Environment

Basic Principles of Agricultural Science

1. Understanding Basic Soil Science Principles
2. Identifying Basic Principles of Plant Science
3. Identifying Basic Principles of Animal Science
4. Identifying Basic Principles of Electricity
5. Identifying Basic Agricultural Mechanics Principles

Plant and Soil Sciences

1. Classifying Soils
2. Classifying Plants
3. Propagating Plants
4. Understanding Plant Germination, Growth, and Development
5. Identifying Career Opportunities in Plant and Soil Science

Horticultural Science and Production

1. Propagating Plants
2. Classifying Horticultural Plants
3. Understanding Plant Anatomy and Physiology
4. Growing Plants Hydroponically

Sample Course Content for Advanced Agricultural Science

Agricultural Literacy

1. Understanding the World Food and Fiber Chain
2. Recognizing the Role of Research and Development in Agriculture

Basic Principles of Agricultural Science

1. Understanding Basic Genetics and Reproduction
2. Understanding and Using Pesticides

Agribusiness Operation and Management

1. Identifying Career Opportunities in Agribusiness Management
2. Using Microcomputers in Agribusiness Management

Animal Science

1. Understanding Animal Anatomy and Physiology
2. Meeting Nutritional Needs of Animals
3. Understanding Animal Breeding and Reproduction
4. Maintaining Animal Health
5. Identifying Alternative Animal Production Systems: Aquaculture
6. Identifying Career Opportunities in Animal Science

Food Science and Technology

1. Processing Agricultural Products
2. Identifying Career Opportunities in Food Science

Horticultural Mechanics

1. Utilizing Energy Alternatives

Applied Biological Science Suggested Biology Units and Agricultural Core Problem Areas

Biology Units	Related Core Problem Areas
I. Applied Genetics A. Classical applied genetics B. Plant and animal breeding C. Molecular biology and recombinant DNA	IC3. Understanding Basic Genetics and Reproduction IIB5. Understanding Animal Breeding and Reproduction
II. Bacteria A. Nitrogen cycle B. Beneficial uses of bacteria in food production C. Food spoilage D. Formation of genetic resistance to drugs and pesticides E. Safe handling of food	IIC1. Enhancing Soil Fertility IC11. Understanding Food Science Technology IID1. Processing Agricultural Products IID2. Adhering to Government Regulations IIIB8. Processing Fruits and Vegetables
III. Multicellular Plants A. Plant structure and function B. Biology of trees	IC5. Identifying Basic Principles of Plant Science IIC4. Classifying Plants IIC6. Understanding Plant Germination, Growth, and Development IIIB4. Understanding Plant Anatomy and Physiology IVB1. Classifying Trees
IV. Invertebrates and Vertebrates A. Insects and other anthropods B. Parasites and earthworms C. Fishes, birds, and mammals D. Relationship of these animals to humans	IVC7. Controlling Wildlife Pests IIC7. Controlling Plant Pests IIB3. Understanding Animal Anatomy and Physiology IVC1. Classifying Fish IVC5. Classifying Game Birds and Animals IA3. Understanding the Relationship Between Agriculture and the Environment IC6. Identifying Basic Principles of Animal Science IVC9. Maintaining Wildlife Habitat
V. Ecological Relationships A. Ecosystems, populations, communities B. Environmental problems	IA3. Understanding the Relationship Between Agriculture and the Environment IC8. Understanding and Using Pesticides IVA1. Conserving Water Resources IVA2. Controlling Air Pollution IVA5. Managing Freshwater Resources

APPENDIX E

Core Curriculum Course Planning Forms

Instructions

Four forms have been prepared to assist teachers in the development of course outlines which are based on the core problem areas. The use of these forms and the core problem area list is based on the assumption that approximately 60% of the instructional program will be drawn from the core problem areas and the other 40% will be other problem areas and content selected by the local/regional teacher.

Suggestions for using the course planning forms are as follows:

Form 1

1. List titles of all agriculture courses to be taught.
2. Indicate length of course either in terms of semester or year-long courses, number of instructional days, or number of weeks.

Form 2

1. Strike out titles of problem areas which will not be taught.
2. Add titles of problem areas to be added. These additions represent the portion of the curriculum which is to be added at the local/regional level.
3. Transfer the course titles tothe top of the grid. Check the course where each problem area will be taught. Instead of a check, you might want to use an I, M, or R for each problem area to indicate where the content is introduced (I), mastered (M), and reinforced (R).

Form 3

1. The completion of Form 3 involves two instructional planning decisions; namely, deciding which problem areas for a given course will be taught each month and allocating a time period for each problem area.
2. Use three or more Form 3s for each course.
3. Copy the titles of the units and problem areas from Form 2, for each month of the school year. (Note: You may prefer to create this form on your computer and then enter the data requested).
4. Decide on the number of instructional days to be allocated to each problem area and record it in the space provided.
5. Adjust number of problem areas and time allocations to match the number of instructional days available.

Form 4

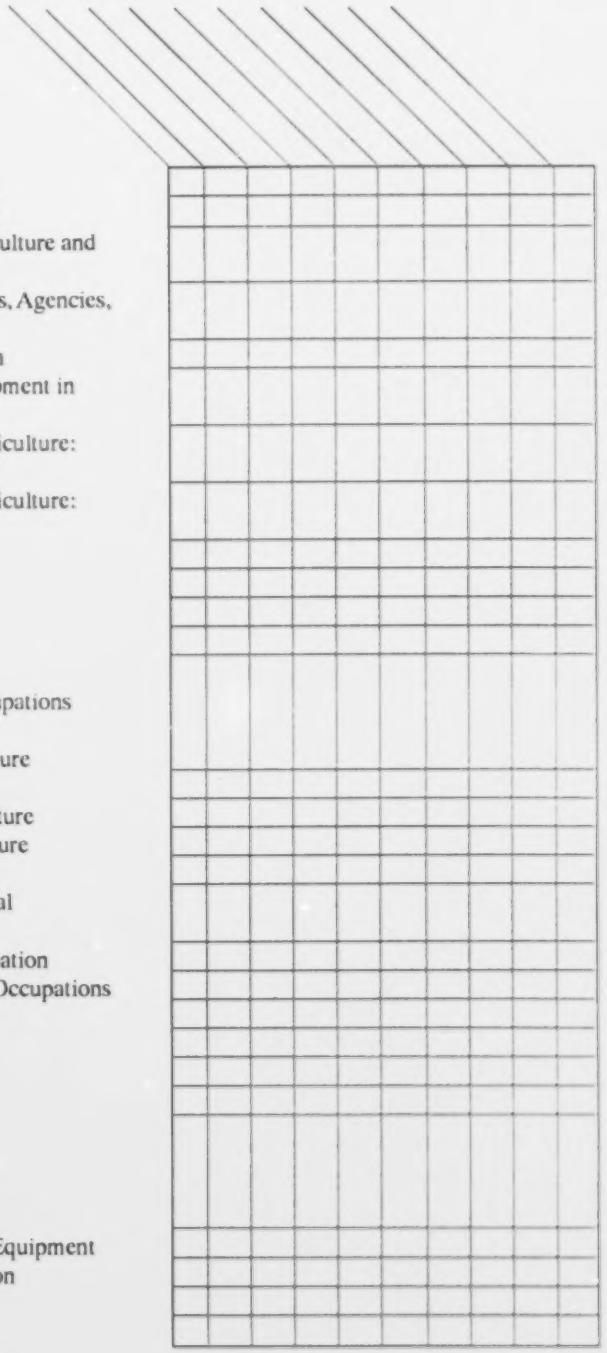
1. Form 4 combines the information from Forms 1, 2, and 3 and identifies the specific information needed in a complete course of study.
2. This information would be used in the development of daily lesson plans for teaching the content identified.
3. It is recommended that this information be reviewed regularly to keep programs and courses current.

Agriculture Course Planning Sheet — Form 1

Course Number	Course Title	Length of Course
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____
10	_____	_____

Agriculture Course Planning Sheet — Form 2
Assignment of Units and Problem Areas to Courses

Units and problem areas listed on this form are taken from the Revised Core Curriculum list. Space is provided for teachers to add additional units and problem areas to supplement the core list. Use a check (✓) mark to show in which course each problem area will be taught. Or you may choose to use an I, M or R where I means the problem area is **introduced**, M means it is **mastered**, and R means it is **reinforced**.



UNITS AND PROBLEM AREAS

I. Central Core Cluster

Unit A: Agricultural Literacy

Problem Areas:

1. Identifying Careers in Agriculture/Horticulture
2. Recognizing the Role of Agriculture in Society
3. Understanding the Relationship Between Agriculture and the Environment
4. Identifying and Using Agricultural Organizations, Agencies, and Sources of Information About Agriculture
5. Understanding the World Food and Fiber Chain
6. Recognizing the Role of Research and Development in Agriculture
7. Recognizing the Impact of Technology on Agriculture: Biotechnology
8. Recognizing the Impact of Technology on Agriculture: Electronics
9.
10.
11.
12.

Unit B: Generalizable Skills in Agricultural Occupations

Problem Areas:

1. Developing Communications Skills in Agriculture
2. Applying Mathematics Skills in Agriculture
3. Developing Human Relations Skills in Agriculture
4. Developing Problem Solving Skills in Agriculture
5. Developing Transition Skills in Agriculture
6. Identifying and Practicing Ethics in Agricultural Occupations
7. Gaining Employment in an Agricultural Occupation
8. Developing Safe Work Habits in Agricultural Occupations
9.
10.
11.
12.

Unit C: Basic Principles of Agricultural Science

Problem Areas:

1. Understanding Basic Soil Science Principles
2. Identifying and Using Agricultural Tools and Equipment
3. Understanding Basic Genetics and Reproduction
4. Using Energy Efficiently
5. Identifying Basic Principles of Plant Science

6. Identifying Basic Principles of Animal Science
7. Identifying Basic Principles of Electricity
8. Understanding and Using Pesticides
9. Identifying Basic Agricultural Mechanics Principles
10. Conserving Agricultural Resources
11. Understanding Food Science Technology
12.
13.
14.
15.

Unit D: Basic Agribusiness Principles and Skills
Problem Areas:
1. Keeping and Using Records in Agricultural Occupations
2. Applying Basic Economic Principles in Agribusiness
3. Developing Basic Microcomputer Skills
4. Understanding Basic Business Organization
5. Managing Personal Finances
6.
7.
8.

Unit E: Developing Leadership Capabilities in Agriculture/ Agribusiness
Problem Areas:
1. Understanding the History and Organization of FFA
2. Recognizing Opportunities in FFA
3. Developing Leadership Skills Through Youth Organizations
4. Participating in Community and Government Leadership
5.
6.
7.

Unit F: Supervised Experience in Agriculture/ Horticulture
Problem Areas:
1. Understanding the Structure and Purposes of SAE
2. Planning and Developing SAE Programs
3. Expanding my SAE
4.
5.

II. Agricultural Business & Management Cluster
Unit A: Agribusiness Operation and Management
Problem Areas:
1. Marketing Agricultural Products and Services
2. Financing the Agribusiness
3. Understanding Agricultural Law Applications
4. Insuring the Agribusiness
5. Planning and Organizing the Agribusiness

6. Advertising and Selling Agricultural Products and Services
7. Operating the Agribusiness
8. Managing Entrepreneurship Opportunities in Agriculture
9. Identifying Career Opportunities in Agribusiness Management
10. Using Microcomputers in Agribusiness Management
11.
12.
13.
14.
15.

Unit B: Animal Science

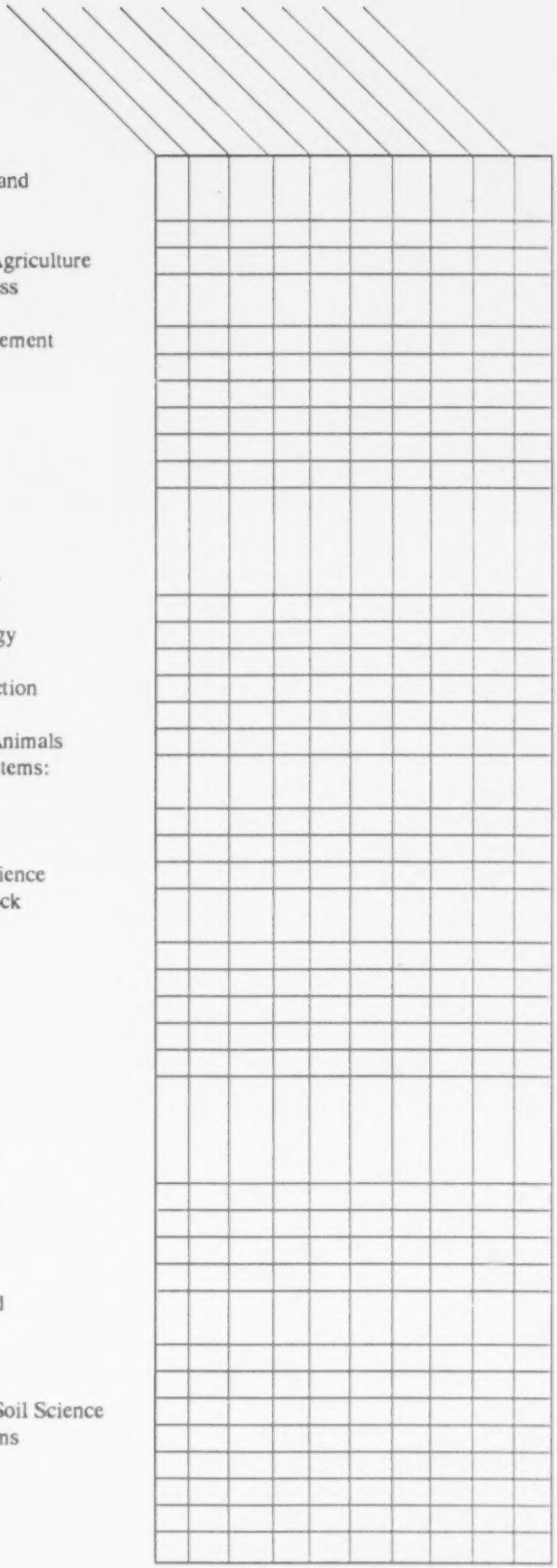
Problem Areas:

1. Understanding the Animal Production Industry
2. Classifying Animals
3. Understanding Animal Anatomy and Physiology
4. Meeting Nutritional Needs of Animals
5. Understanding Animal Breeding and Reproduction
6. Maintaining Animal Health
7. Meeting the Environmental Requirements of Animals
8. Identifying Alternative Animal Production Systems: Aquaculture
9. Conserving Wildlife Resources
10. Caring for Animals
11. Identifying Career Opportunities in Animal Science
12. Understanding Economic Principles of Livestock Production
13.
14.
15.
16.
17.

Unit C: Plant and Soil Science

Problem Areas:

1. Enhancing Soil Fertility
2. Preventing Soil Erosion and Managing Land
3. Classifying Soils
4. Classifying Plants
5. Propagating Plants
6. Understanding Plant Germination, Growth, and Development
7. Controlling Plant Pests
8. Maintaining Grain Quality
9. Identifying Career Opportunities in Plant and Soil Science
10. Identifying Alternative Crop Production Systems
11.
12.
13.
14.



Unit D: Food Science and Technology
Problem Areas:

1. Processing Agricultural Products
2. Adhering to Government Regulations
3. Meeting Nutritional Needs of Food Consumers
4. Packaging and Distributing Food Products
5. Identifying Career Opportunities in Food Science
6.
7.
8.

Unit E: Agricultural Engineering/Mechanization
Problem Areas:

1. Welding and Metalworking
2. Designing, Building, and Maintaining Agricultural Structures
3. Repairing and Maintaining Agricultural Equipment
4. Understanding and Maintaining Small Engines
5. Financing and Managing Agricultural Equipment
6. Manufacturing, Distributing, Selling, and Servicing Agricultural Equipment
7. Identifying Career Opportunities in Agricultural Engineering/Mechanization
8.
9.
10.
11.
12.

III. Horticulture Cluster

Unit A: Horticultural Business Operation and Management
Problem Areas:

1. Marketing Horticultural Products and Services
2. Financing the Horticultural Business
3. Insuring the Horticultural Business
4. Planning and Organizing the Horticultural Business
5. Advertising and Selling Horticultural Products
6. Operating the Horticultural Business
7.
8.
9.

Unit B: Horticultural Science and Production
Problem Areas:

1. Propagating Plants
2. Understanding Plant Germination, Growth, and Development
3. Classifying Horticultural Plants
4. Understanding Plant Anatomy and Physiology
5. Growing Ornamental Plants
6. Growing Vegetables
7. Growing Fruits
8. Processing Fruits and Vegetables

9. Controlling Plant Pests
10. Enhancing Soil Fertility
11. Developing Growing Media
12. Growing Plants Hydroponically
13.
14.
15.
16.
17.

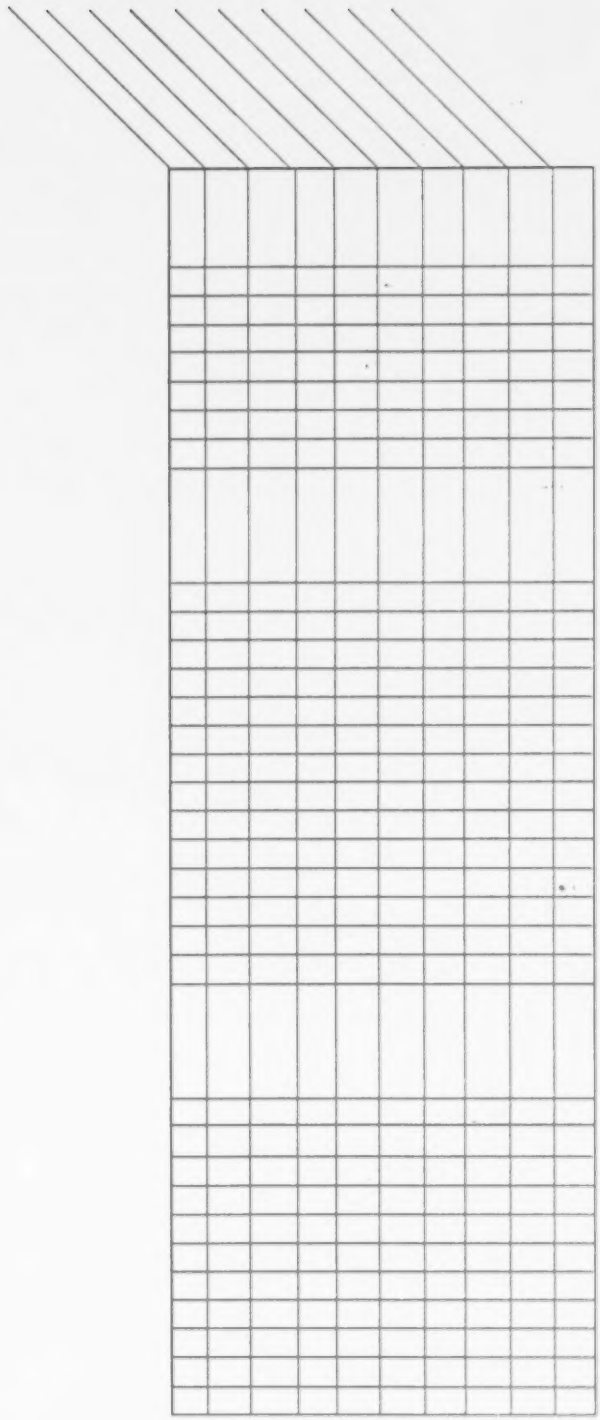
Unit C: Horticultural Mechanics
Problem Areas:
1. Designing, Building, and Maintaining Horticultural Structures
2. Utilizing Energy Alternatives
3. Repairing and Maintaining Small Engines
4. Repairing, Maintaining, and Operating Horticultural Equipment
5.
6.

Unit D: Landscaping
Problem Areas:
1. Designing and Drawing Landscape Plans
2. Establishing and Maintaining Turf Areas
3. Transplanting and Maintaining Landscape Plants
4. Surveying, Grading, and Tiling
5. Interior Plantscaping
6.
7.

Unit E: Floral Design
Problem Areas:
1. Handling and Preparing Cut Flowers
2. Designing Silk and Dried Arrangements
3. Designing Live Arrangements
4. Identifying Principles of Floral Design
5.
6.

IV. Agricultural Resources Cluster

Unit A: Environmental Protection
Problem Areas:
1. Conserving Water Resources
2. Controlling Air Pollution
3. Understanding Government Regulations and Controls
4. Managing Land Resources
5. Managing Freshwater Resources
6.
7.
8.



Unit B: Forestry
Problem Areas:

1. Classifying Trees
2. Identifying Trees and Forestry Products
3. Managing Forestry Resources
4. Producing Christmas Trees
5. Processing Forest Products
6.
7.
8.

Unit C: Fish and Wildlife Management
Problem Areas:

1. Classifying Fish
2. Stocking Fish
3. Feeding Fish
4. Managing Fish
5. Classifying Game Birds and Animals
6. Feeding Game Birds and Animals
7. Controlling Wildlife Pests
8. Raising Game Birds and Animals
9. Maintaining Wildlife Habitat
10.
11.
12.
13.
14.
15.

Unit D: Outdoor Recreation
Problem Areas:

1. Managing Game Preserves
2. Managing Hunting and Fishing Clubs
3. Practicing Hunting Safety
4. Identifying Outdoor Recreational Enterprises
5. Adhering to Laws and Regulations
6. Managing Golf Courses
7. Managing Parks and Recreational Areas
8.
9.
10.
11.

Agriculture Course Planning Sheet — Form 3
Course Outline and Schedule

Course Title _____

Units and Problem Areas | Number of Days

Month _____

Month _____

Month _____

Agriculture Course Planning Sheet — Form 4
Format for Course of Study

I. Course Title: _____ Length: _____

II. Course Description:

III. Course Objectives

A.
B.
C.
D.
E.

IV. Course Content

A. Problem Area Title, Time Allocation, (Note:)

B. List of Resources (books, periodicals, videos, films, slides, etc.)

C. List of Equipment, Tools, Supplies, Facilities (lab, classroom, land)

D. Outline of Content to Cover (presentation)

1. Interest Approach (introduction)
2. Objectives
3. Problems and Concerns
4. Activities

E. Evaluations (tests, quizzes, lab worksheets, etc.)

V. Additional Notes

Prepared by: _____ Date: _____

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